OPERATIVE PROCEDURE

OPERATIVE PROCEDURE

This book was first published in the United States of America, where it has proved of great service to surgeons and medical students alike

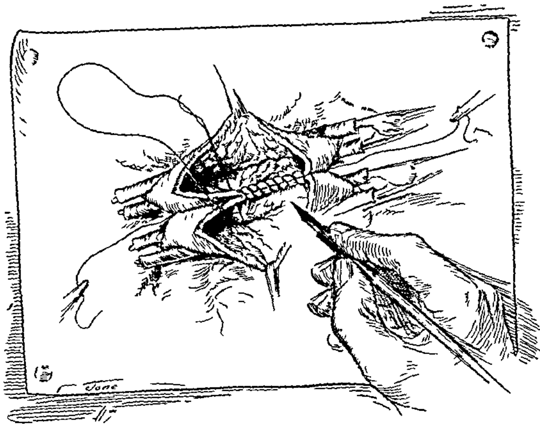
The few copies which reached this country were so warmly welcomed that the publishers decided to print a British edition of the book

Text and illustrations remain identical with those in the original American edition

Johnson & Johnson (GREAT BRITAIN) LIMITED

Slough Bucks England

Printed and made in England at the Fanfare Press London



The Origin and Function of the 'Operative Procedure' Series

This series of plates published by Johnson & Johnson in the leading surgical journals of the United States of America was prepared in collaboration with the staff of Surgery Gynecology and Obstetrics

THE SURGEON who casually views or carefully studies these illustrations will realize that they are not to be found elsewhere in medical or surgical literature As originals, it is understood that they have to be carefully prepared but the amount of effort expended in selecting the subject and then later selecting the important steps to be illustrated may not be comprehended as quickly

There is probably no branch of science or art which has given more evidence of progress in the last two decades than the science of surgical technique The perfection of older methods and originality in new methods have given to the world a mass of material which is worthy *of careful immediate study and preservation for future reference*

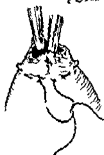
The selection of the subjects in this series was made with the help of several surgeons whose practice and experience enabled the pointing out of not only the most timely technique but likewise the outstanding steps In this way the artist was furnished with material from which he might accurately illustrate approved technique in a new and original manner

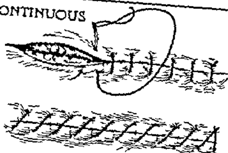
LIGATURE DEPARTMENT

JOHNSON & JOHNSON

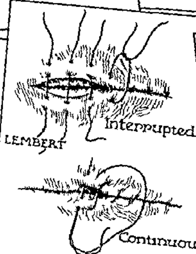
SLOUGH BUCKS

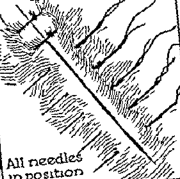
SUTURE TECHNIQUE (NO 1)

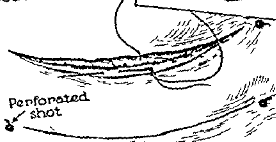


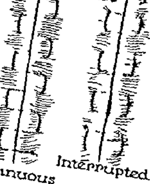


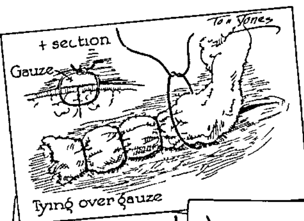


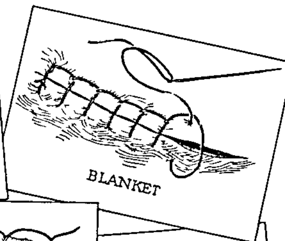


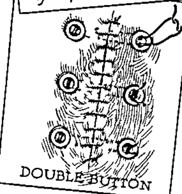


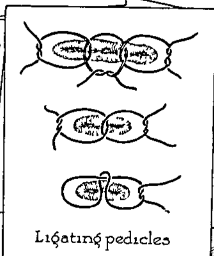


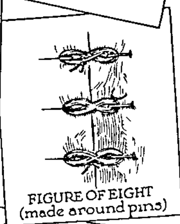


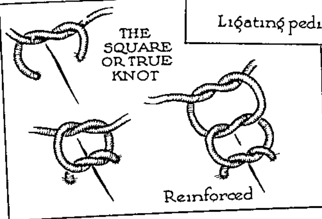

+ section
Gauze
Tying over gauze

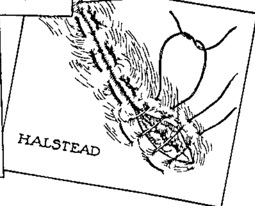

BLANKET


DOUBLE BUTTON


Ligating pedicles

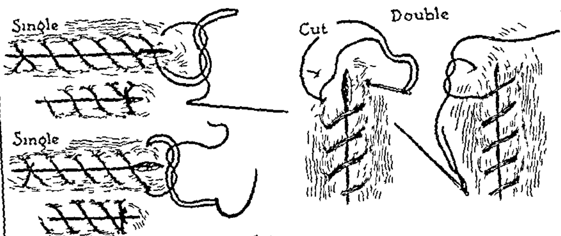

FIGURE OF EIGHT
(made around pins)


THE SQUARE OR TRUE KNOT
Reinforced

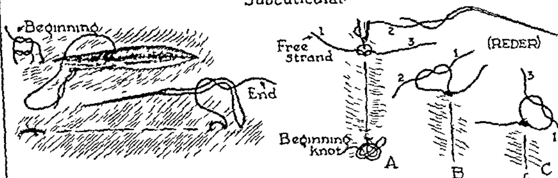

HALSTEAD

SUTURE TECHNIQUE (NO 3)

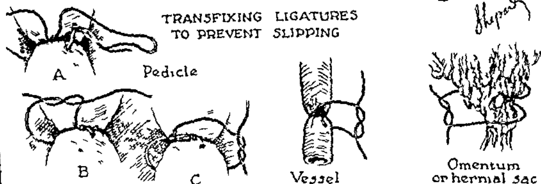
METHODS FOR SECURING THE ENDS OF CONTINUOUS SUTURES

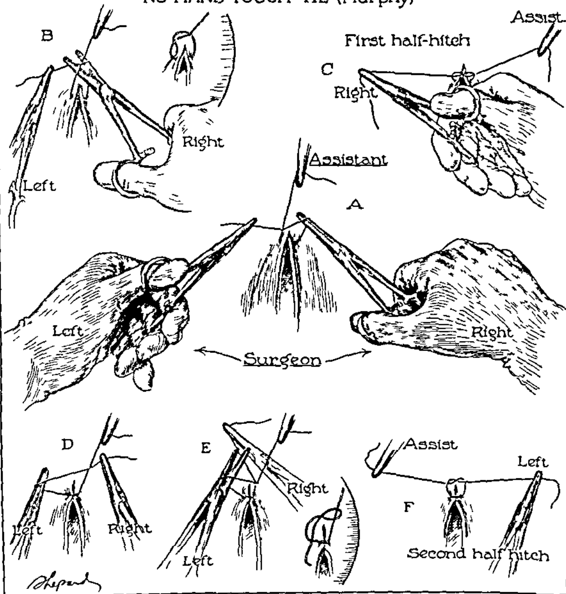


Subcuticular

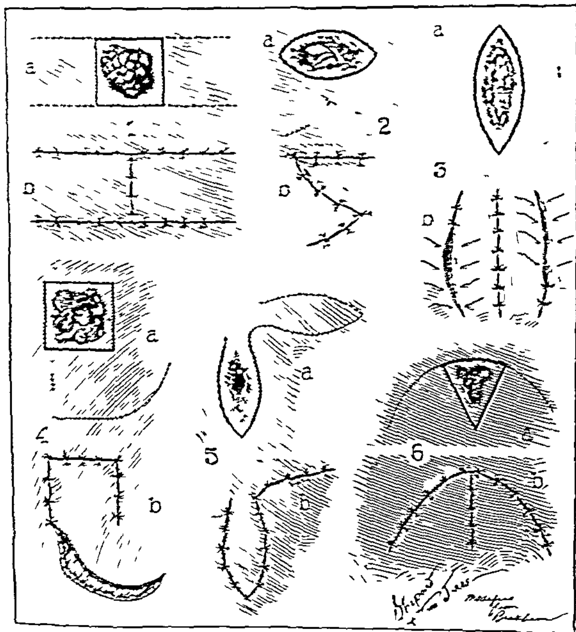


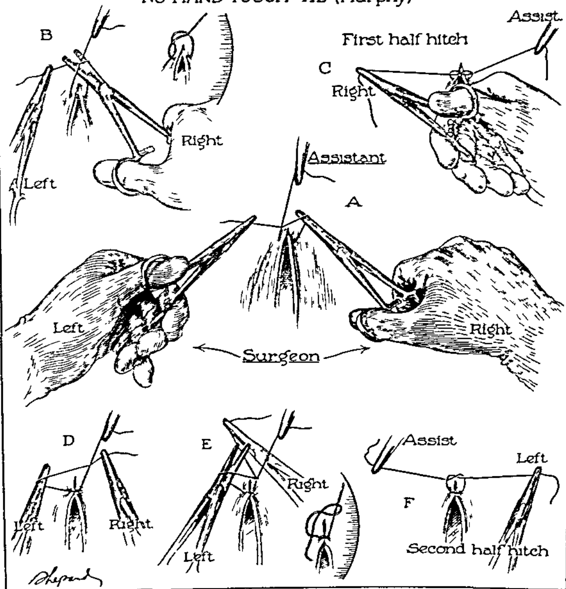
TRANSFIXING LIGATURES TO PREVENT SLIPPING




"NO HAND-TOUCH TIE (Murphy)
B
Right
Left
Assist.
First half-hitch
C
Right
Assistant
A
Left
Right
Surgeon
D
Left
Right
E
Right
Left
Assist
Left
F
Second half hitch

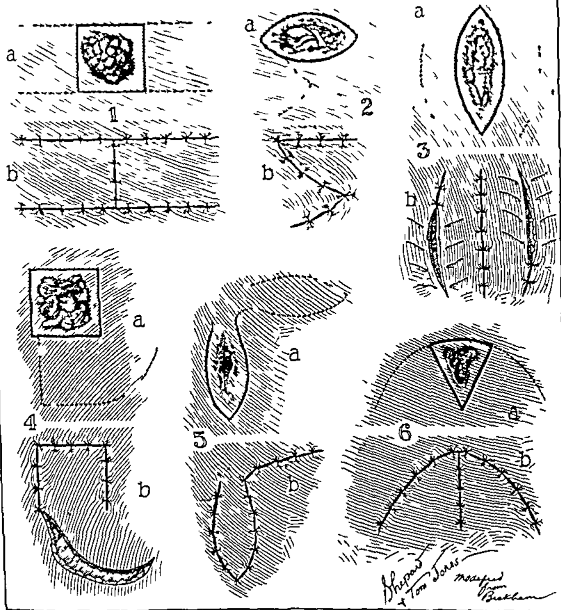
CLOSURE OF SKIN DEFECTS



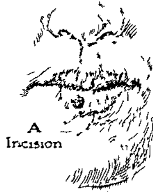


"NO-HAND-TOUCH TIE (Murphy)
B
Left
Right
First half hitch
Assist.
C
Right
Assistant
A
Left
Right
Surgeon
D
Left
Right
E
Right
Left
Assist
Left
F
Second half hitch

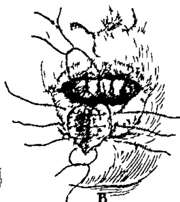
CLOSURE OF SKIN DEFECTS



EARLY CASE



A
Incision

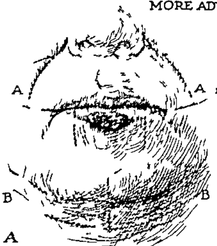


B
Sutures in position
(Stitches in mucous membrane tied first)

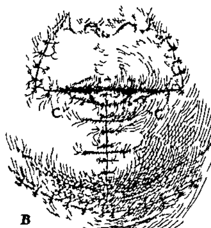


C
Sutures tied (Note fulness in center to prevent subsequent notching)

MORE ADVANCED CASE

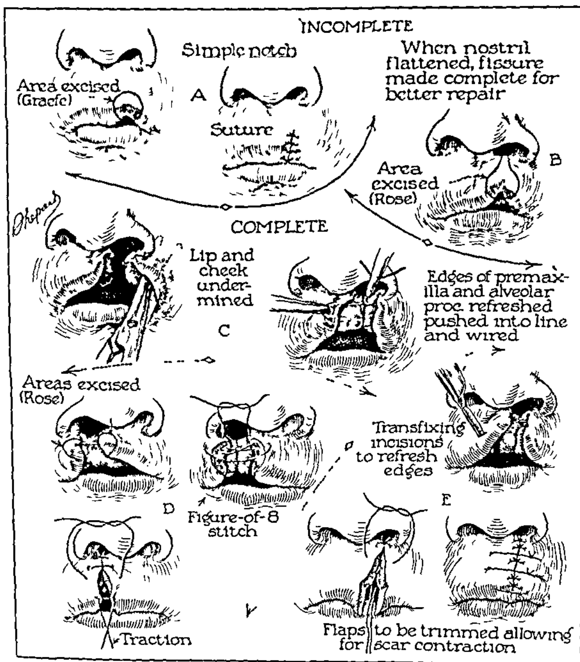


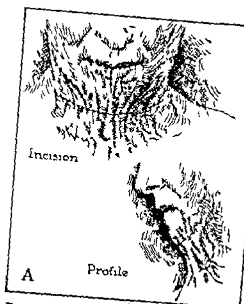
A
Incisions AA Triangles of skin removed to permit reconstruction of lower lip BB Incision for removal of lymph nodes



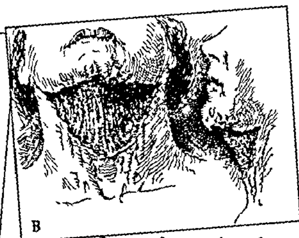
B
Operation completed Note reconstructed vermilion border CC of mucous membrane of cheek

OPERATIONS FOR HARELIP—SINGLE CLEFT

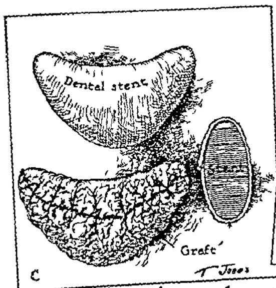




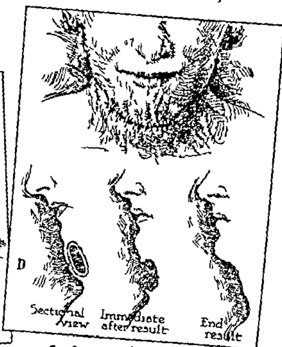
Burn contracture of neck



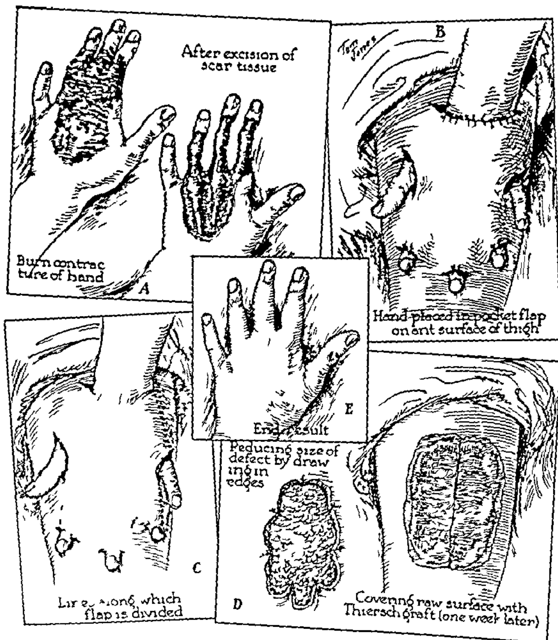
Raw surface resulting from simple division of scar and freeing of tension



Graft with raw surface outward wrapped about mold of dental stent



Graft covered mold buried in raw surface

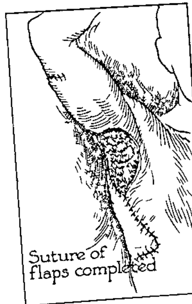

After excision of scar tissue
Burn contracture of hand
A
B
Hand placed in pocket flap on ant surface of thigh
E
End result
Reducing size of defect by drawing in edges
C
flap is divided
D
Covering raw surface with Thiersch graft (one week later)

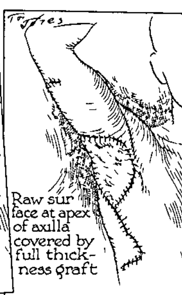
TREATMENT OF BURN CONTRACTURE OF AXILLA













SKIN GRAFTING FREE FULL THICKNESS GRAFTS

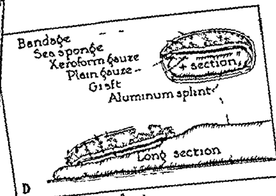


Extent of raw surface resulting from excision of scar





Suture of graft completed with fine sutures

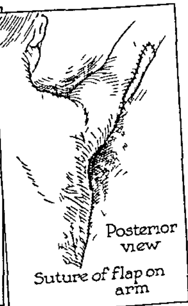


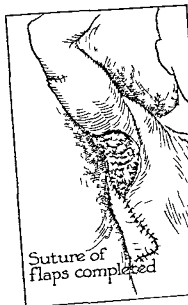
Application of pressure dressing over graft

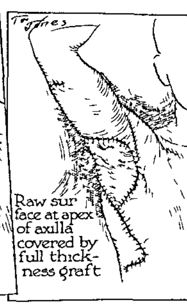
TREATMENT OF BURN CONTRACTURE OF AXILLA





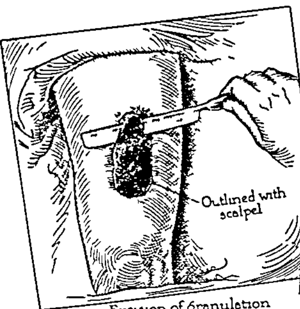




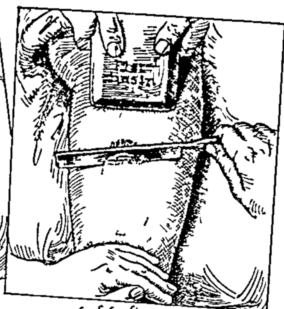


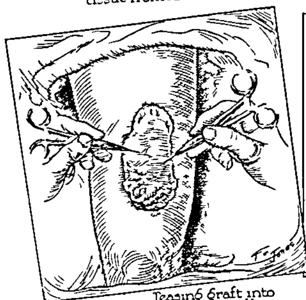


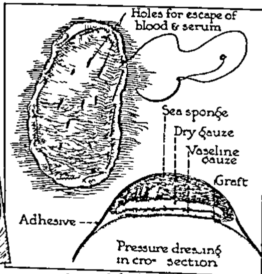
SKIN GRAFTING—SPLIT GRAFTS



Excision of granulation tissue from raw area

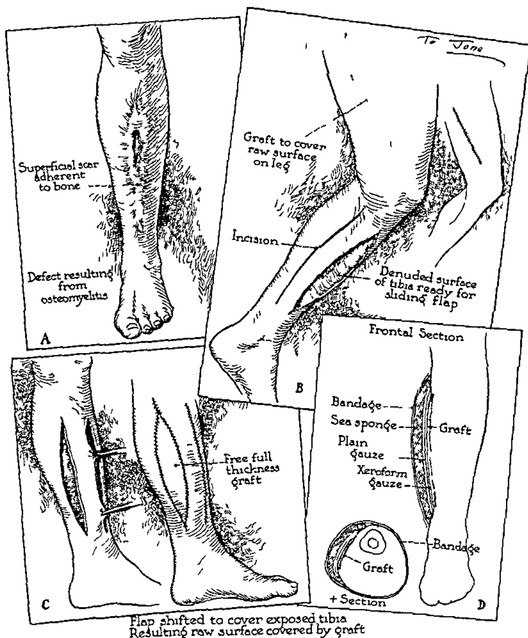

Cutting of graft Skin under tension


Teasing graft into position with needles

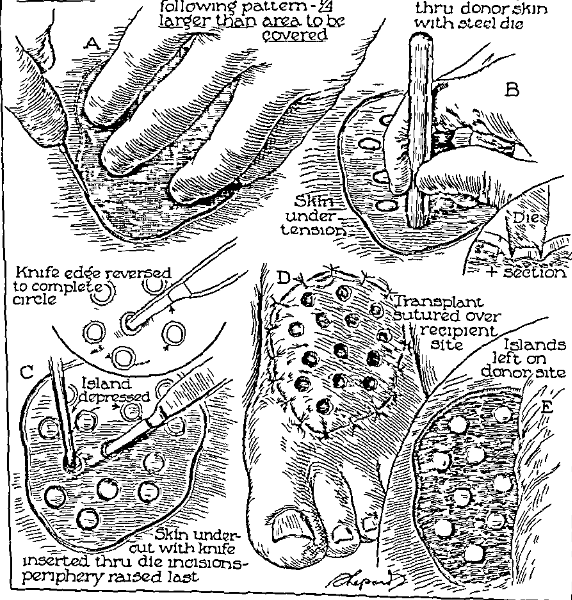


Anchoring graft with fine skin suture

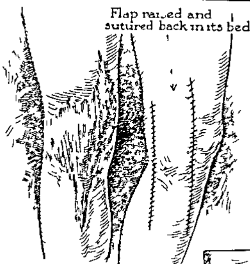
FULL THICKNESS GRAFT WITH SLIDING FLAP

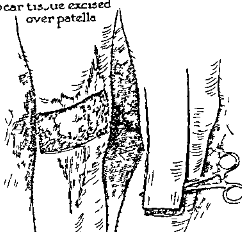


Flap shifted to cover exposed tibia
Resulting raw surface covered by graft

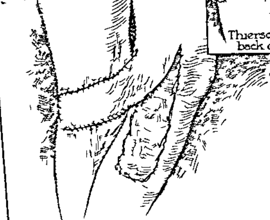

DOUGLAS
Donor skin incised following pattern - ¼ larger than area to be covered
A
Islands bored thru donor skin with steel die
B
Skin under tension
Die
+ section
Knife edge reversed to complete circle
D
Transplant sutured over recipient site
Islands left on donor site
C
Island depressed
E
Skin under-cut with knife inserted thru die incisions-periphery raised last

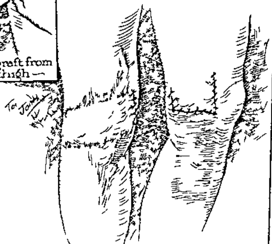
DELAYED PEDICLED FLAP



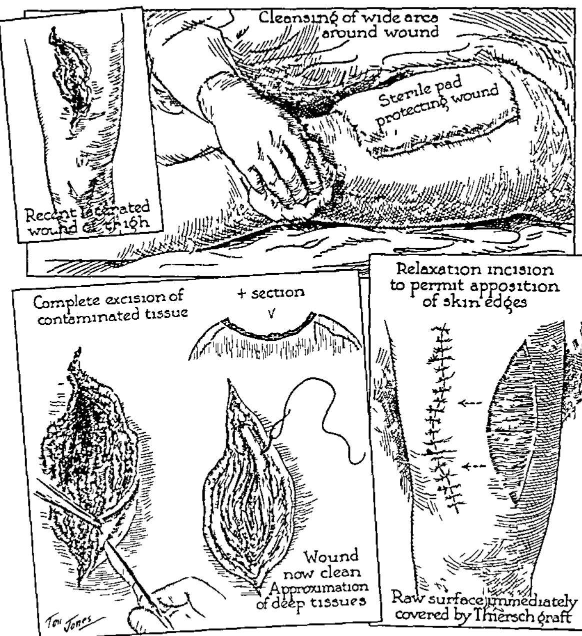








IDEAL TREATMENT OF LACERATED WOUND



DRAGSTEDT-WILSON

Oval shaped full-thickness transplant taken from abdomen

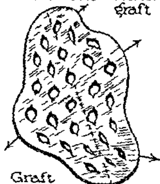
A

Comparison of recipient and donor areas

Transplant placed on towel moistened with salt solution

B

Multiple overlapping incisions

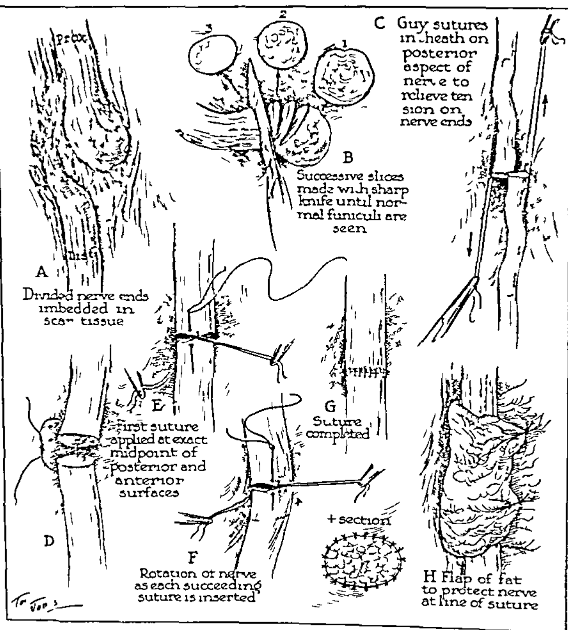


Sieve graft sutured to recipient site

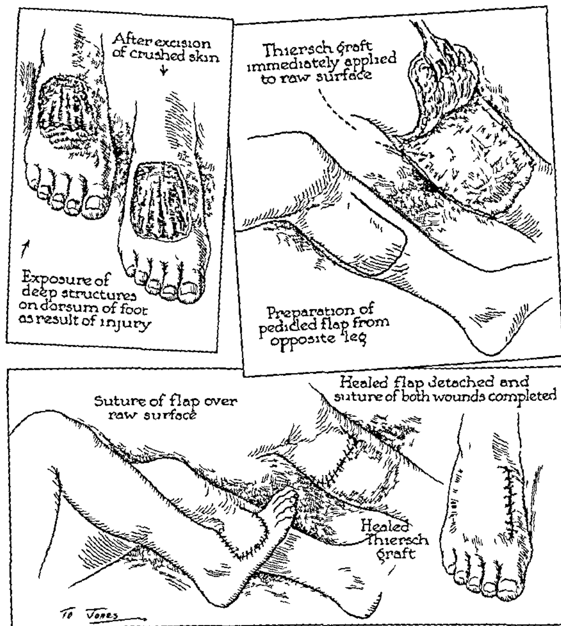
C

Skin defect closed over donor site

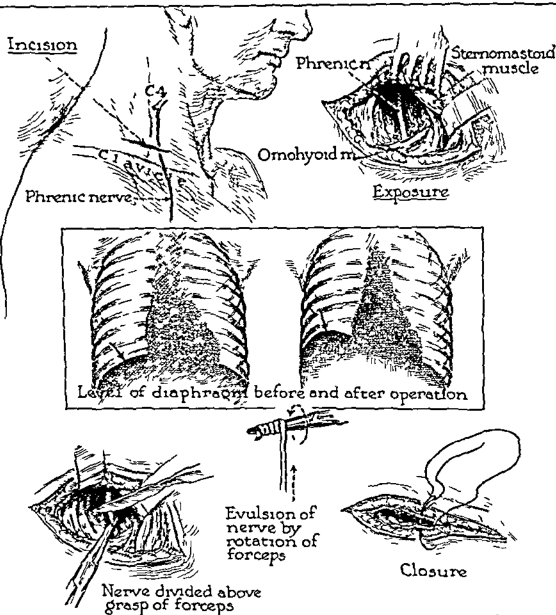
D

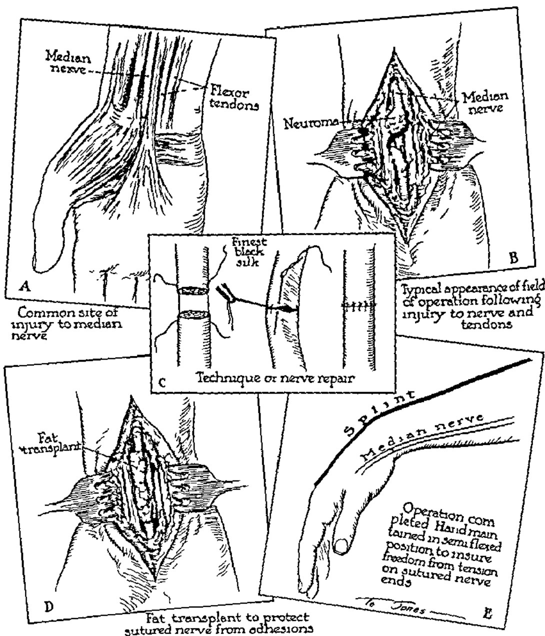

Prox
Dist
A
Divided nerve ends imbedded in scar tissue
1
2
3
B
Successive slices made with sharp knife until normal funiculi are seen
C Guy sutures in sheath on posterior aspect of nerve to relieve tension on nerve ends
D
E
First suture applied at exact midpoint of posterior and anterior surfaces
F
Rotation of nerve as each succeeding suture is inserted
G
Suture completed
+ section
H Flap of fat to protect nerve at line of suture

IMMEDIATE TREATMENT OF CRUSHING INJURY OF FOOT

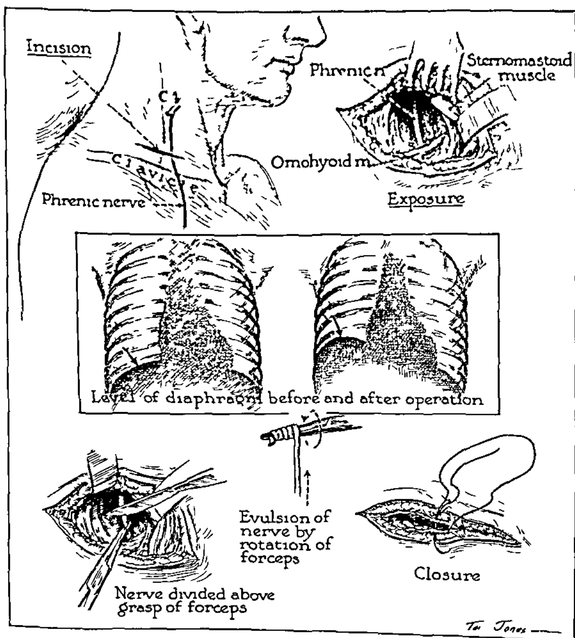


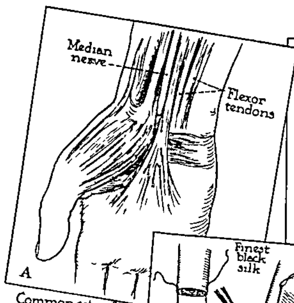
PHRENIC NEURECTOMY



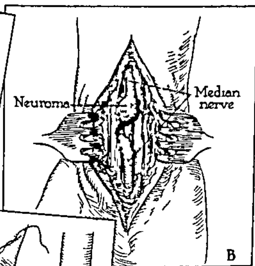

Median nerve
Flexor tendons
A
Common site of injury to median nerve
Neuroma
Median nerve
B
Typical appearance of field of operation following injury to nerve and tendons
Finest black silk
C
Technique of nerve repair
Fat transplant
D
Fat transplant to protect sutured nerve from adhesions
Splint
Median nerve
Operation completed. Hand maintained in semi flexed position, to insure freedom from tension on sutured nerve ends
E

PHRENIC NEURECTOMY

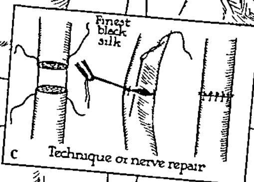




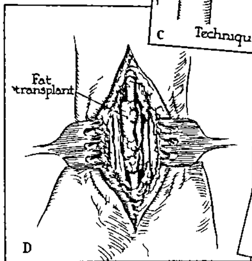
Common site of injury to median nerve



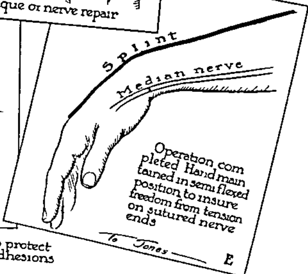
Typical appearance of field of operation following injury to nerve and tendons



Technique of nerve repair

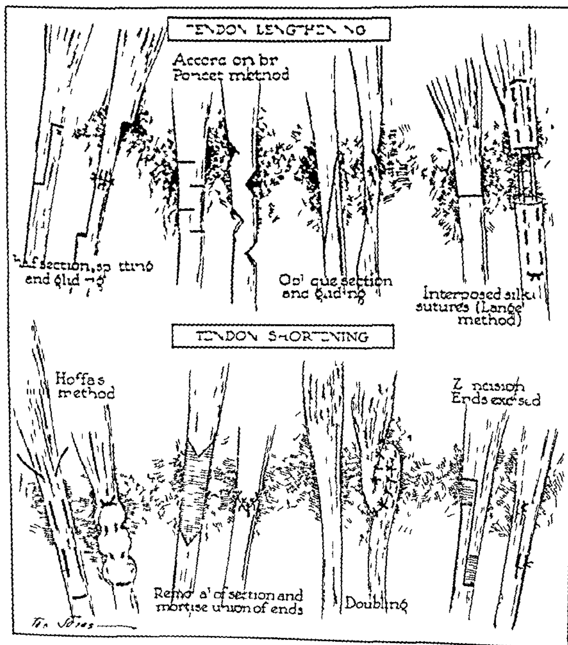


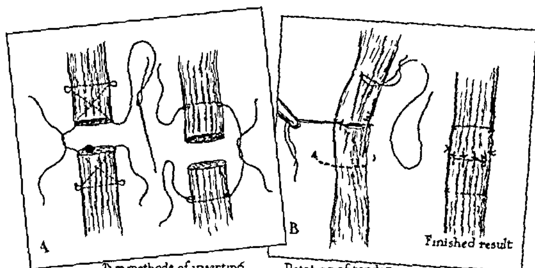
Fat transplant to protect sutured nerve from adhesions



Operation completed Hand maintained in semi flexed position to insure freedom from tension on sutured nerve ends

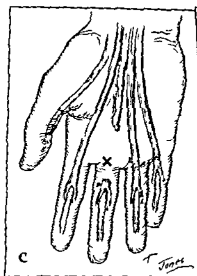
TENDON LENGTHENING AND SHORTENING



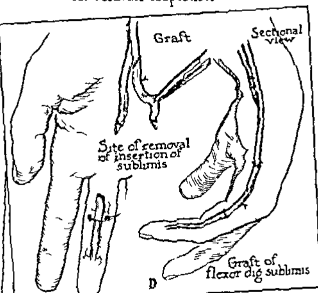


Two methods of inserting stay sutures in divided tendons

Rotation of tendon to permit insertion of sutures for accurate coaptation

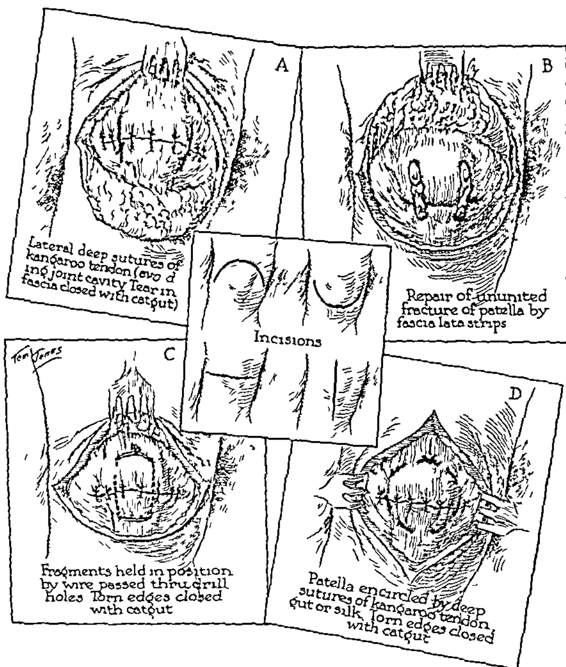


A common site (x) of tendon injury, with resulting retraction of tendon ends



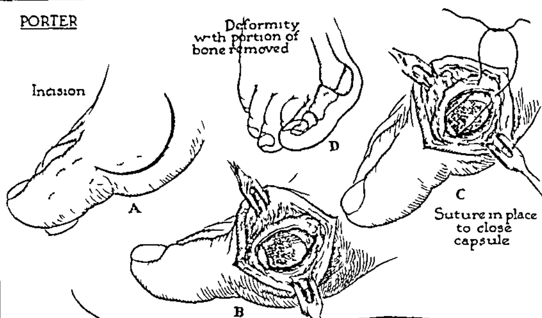
Technique of repair (Finger semi flexed)

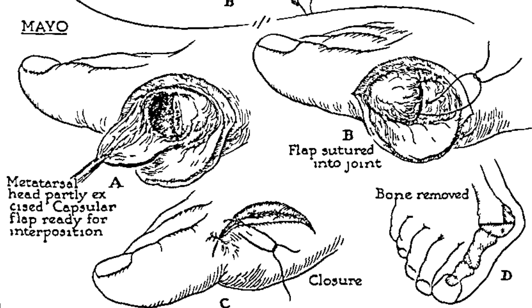
REPAIR OF FRACTURED PATELLA



REPAIR OF RECURRENT DISLOCATION OF PATELLA

OPERATIVE TREATMENT OF BUNIONS





Tourniquet applied
A

Skin incisions
B
Knee flexed over end of table

C
Towels clipped to skin edges

Patellar ligament and fat pad retracted
E

Joint manipulated with patients foot between knees of surgeon

D
Joint capsule opened between clamps

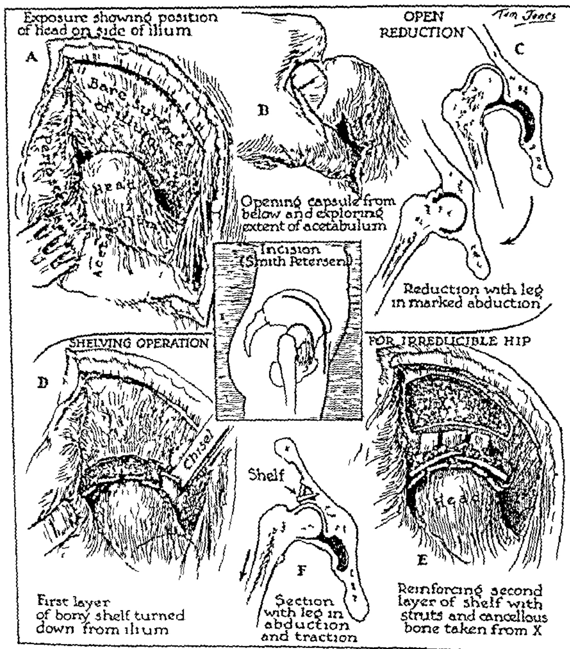
Medial meniscus dissected from head of tibia
F

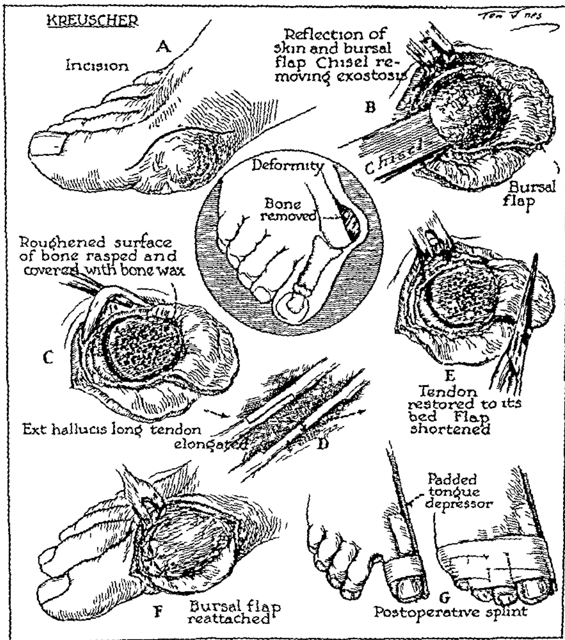
Use of special knife (Lowe Breck)

Suture of capsule fascia and skin
G

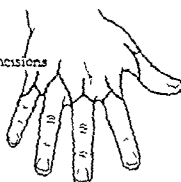
Shepard

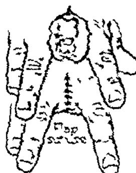
OPERATION FOR CONGENITAL DISLOCATED HIP

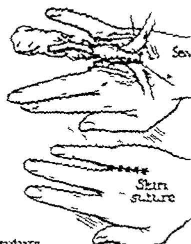



KREUSCHER
A
Incision
Reflection of skin and bursal flap Chisel removing exostosis
B
Chisel
Bursal flap
Deformity
Bone removed
Roughened surface of bone rasped and covered with bone wax
C
E
Tendon restored to its bed Flap shortened
Ext hallucis long tendon elongated
D
Padded tongue depressor
F
Bursal flap reattached
G
Postoperative splint

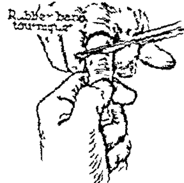
METACARPOPHALANGEAL DISARTICULATION AND AMPUTATION PROXIMAL TO THE METACARPAL HEAD

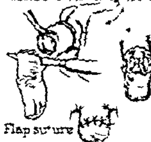






INTERPHALANGEAL DISARTICULATION







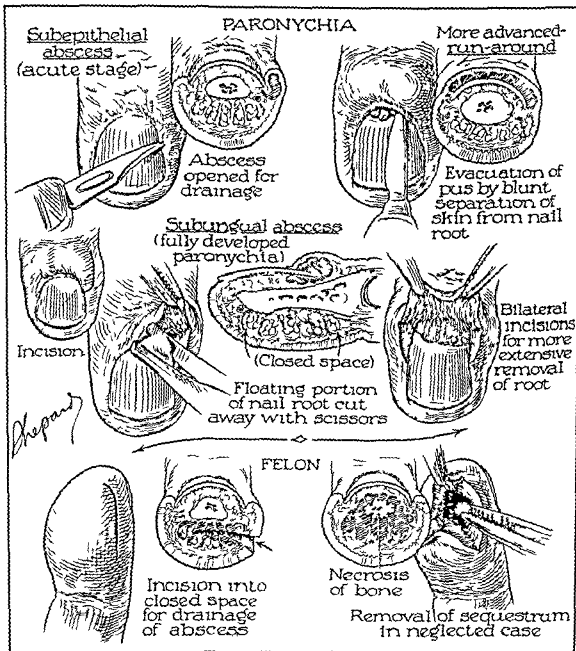
DISARTICULATION OF THE TOES



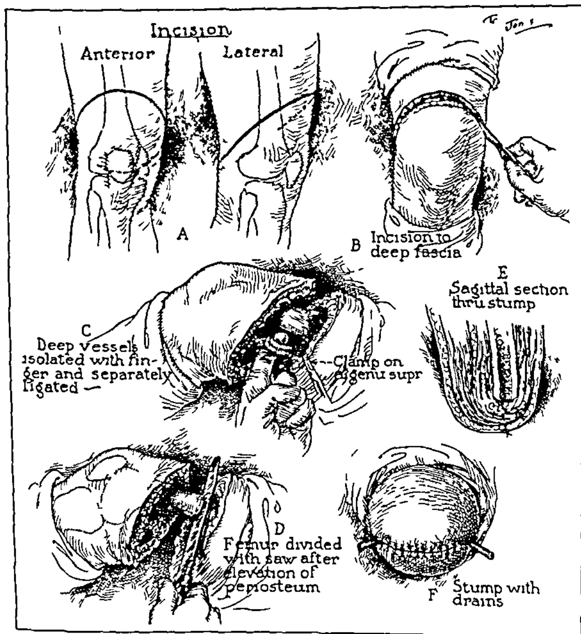


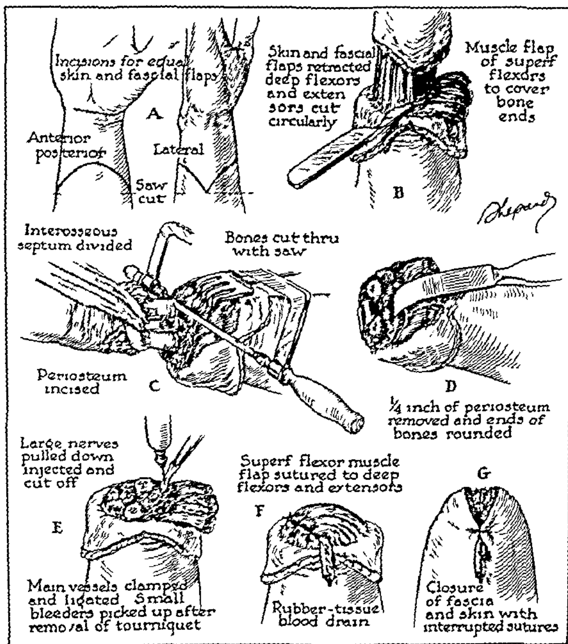


SURGICAL TREATMENT FOR PARONYCHIA AND FELON

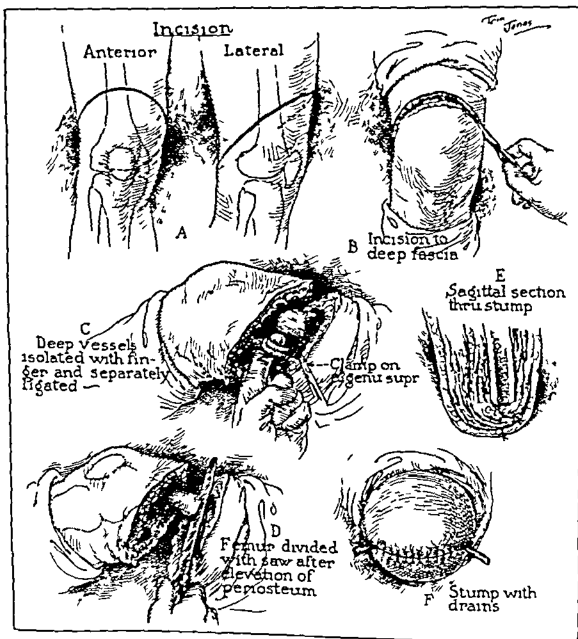


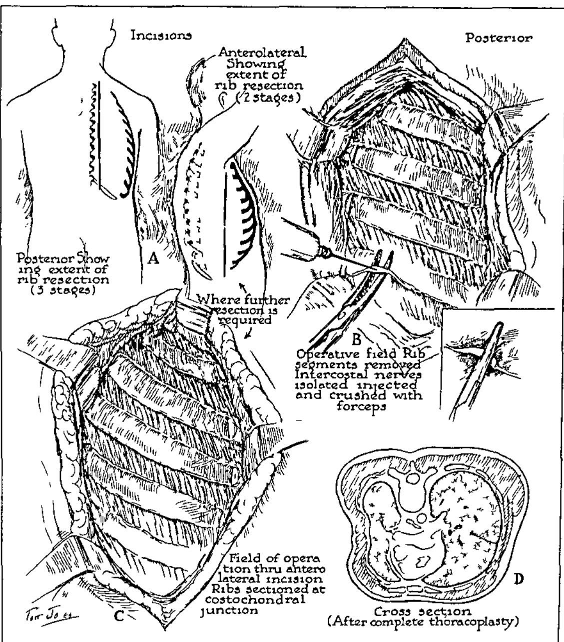
AMPUTATION FOR GANGRENE OF LOWER EXTREMITY

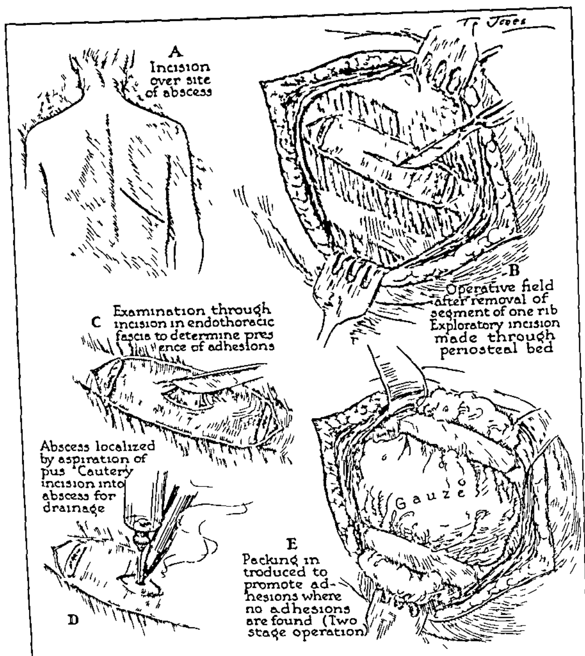



Incisions for equal skin and fascial flaps
A
Anterior posterior
Lateral
Saw cut
Skin and fascial flaps retracted deep flexors and extensors cut circularly
Muscle flap of superf flexors to cover bone ends
B
Interosseous septum divided
Bones cut thru with saw
Periosteum incised
C
D
¼ inch of periosteum removed and ends of bones rounded
Large nerves pulled down injected and cut off
E
Main vessels clamped and ligated Small bleeders picked up after removal of tourniquet
Superf flexor muscle flap sutured to deep flexors and extensors
F
Rubber-tissue blood drain
G
Closure of fascia and skin with interrupted sutures

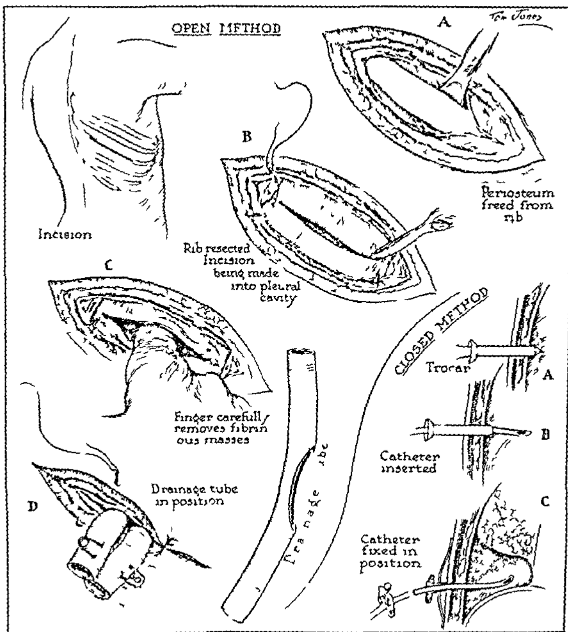
AMPUTATION FOR GANGRENE OF LOWER EXTREMITY



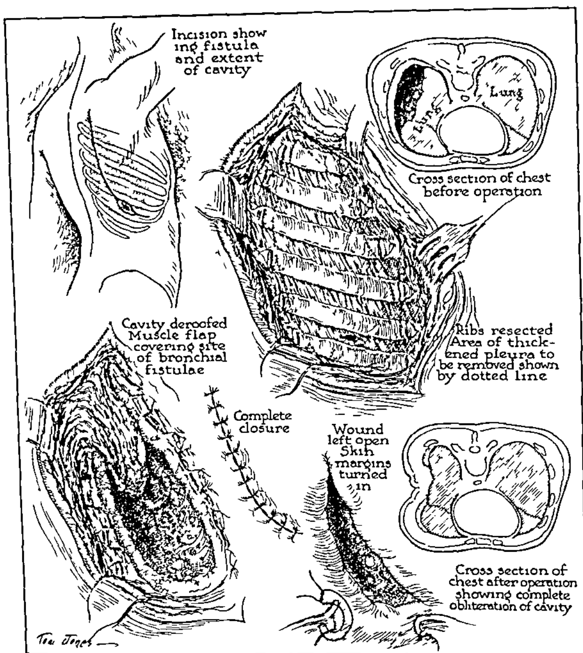

Incisions
Posterior
Anterolateral
Showing
extent of
rib resection
(2 stages)
Posterior Show
ing extent of
rib resection
(3 stages)
A
Where further
resection is
required
B
Operative field Rib
segments removed
Intercostal nerves
isolated injected
and crushed with
forceps
Field of opera
tion thru antero
lateral incision
Ribs sectioned at
costochondral
junction
C
D
Cross section
(After complete thoracoplasty)


A
Incision over site of abscess
B
Operative field after removal of segment of one rib
Exploratory incision made through periosteal bed
C
Examination through incision in endothoracic fascia to determine presence of adhesions
Abscess localized by aspiration of pus Cautery incision into abscess for drainage
D
E
Packing introduced to promote adhesions where no adhesions are found (Two stage operation)
Gauze

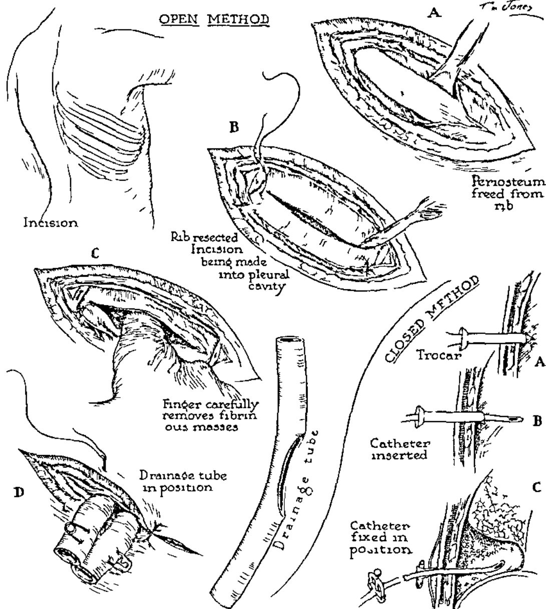
SURGICAL TREATMENT OF ACUTE EMPYEMA



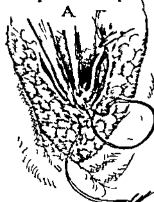
SURGICAL TREATMENT OF ACUTE EMPYEMA

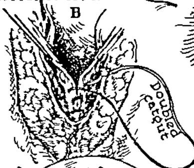


SURGICAL TREATMENT OF ACUTE EMPYEMA

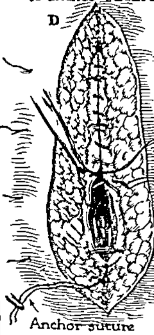


CLOSURE OF RECTUS INCISION

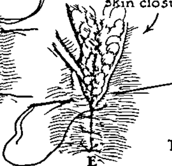


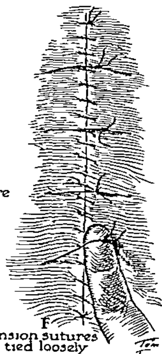




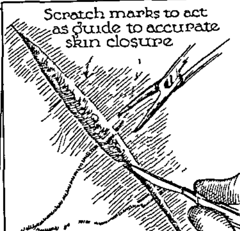


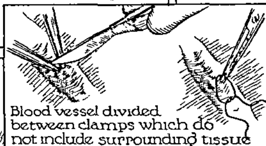


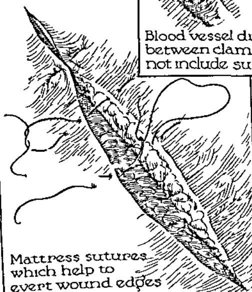


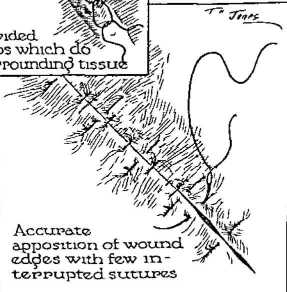



Holding skin
taut as incision
is made to
facilitate accur
ate technique.

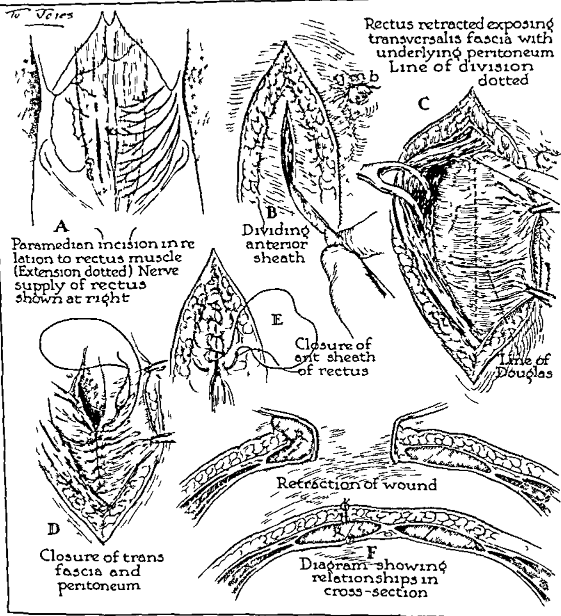

Scratch marks to act
as guide to accurate
skin closure
Blood
vessel ex-
posed and isolated
before division

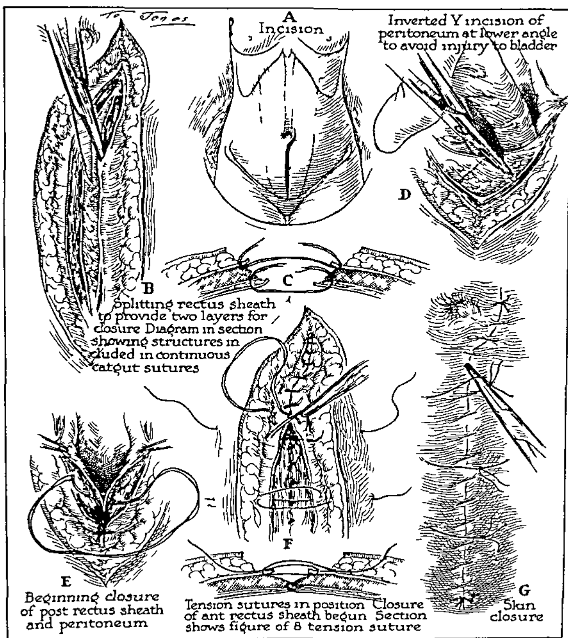

Blood vessel divided
between clamps which do
not include surrounding tissue


Mattress sutures
which help to
evert wound edges

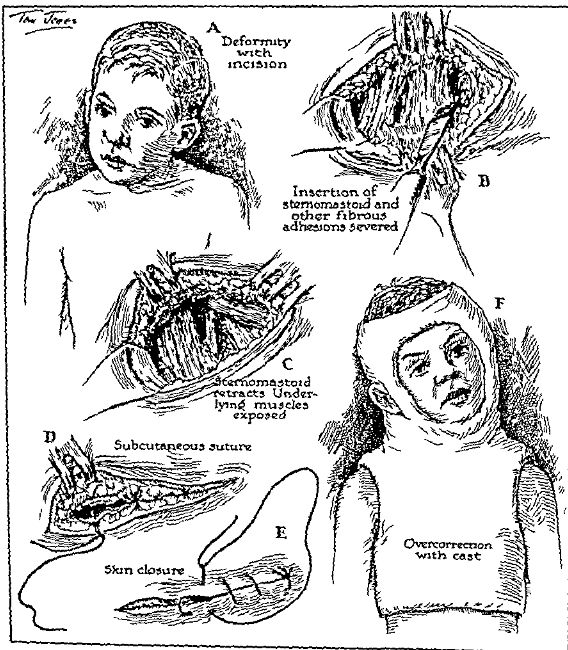

Accurate
apposition of wound
edges with few in-
terrupted sutures

PARAMEDIAN INCISION FOR LAPAROTOMY



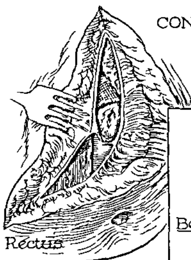

A
Incision
Inverted Y incision of peritoneum at lower angle to avoid injury to bladder
D
B
C
Splitting rectus sheath to provide two layers for closure Diagram in section showing structures included in continuous catgut sutures
E
Beginning closure of post rectus sheath and peritoneum
F
Tension sutures in position Closure of ant rectus sheath begun Section shows figure of 8 tension suture
G
Skin closure

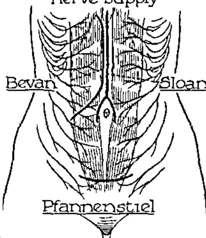
OPERATION FOR TORTICOLLIS

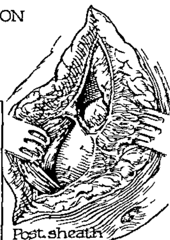


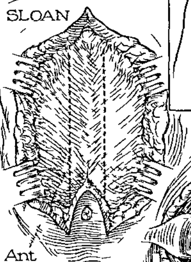
CONSERVING INNERVATION OF THE RECTI

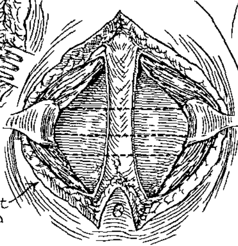
BEVAN
(Gall bladder on right side spleen on left)

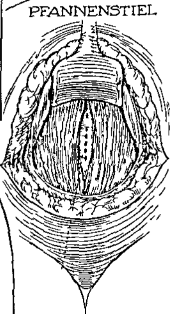


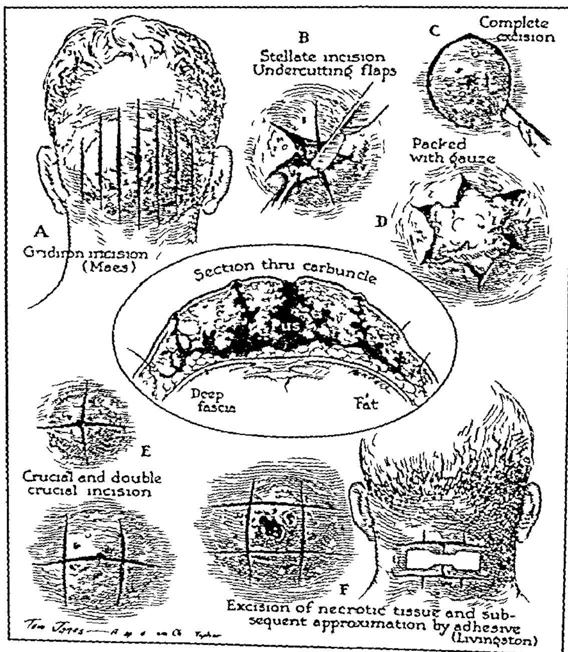








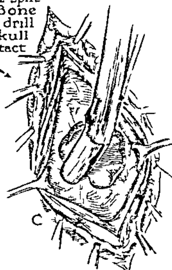



A
Gridiron incision (Mees)
B
Stellate incision
Undercutting flaps
C
Complete excision
Packed with gauze
D
Section thru carbuncle
Pus
Deep fascia
Fat
E
Crucial and double crucial incision
F
Excision of necrotic tissue and subsequent approximation by adhesive (Livingston)

SUBTEMPORAL DECOMPRESSION







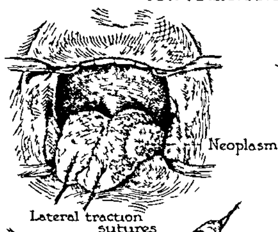


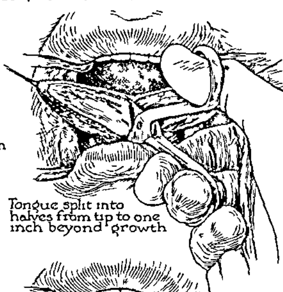


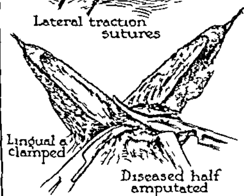


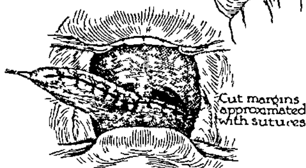


RESECTION OF LATERAL HALF OF TONGUE FOR MALIGNANCY (WHITEHEAD)



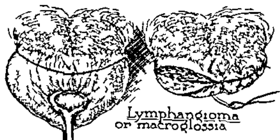




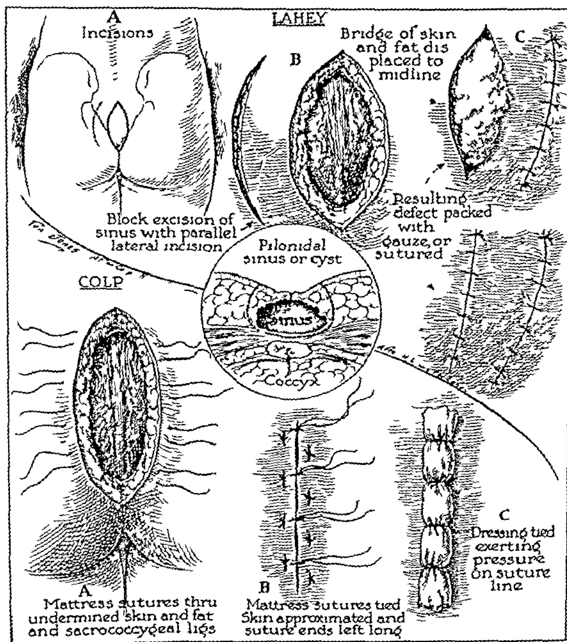


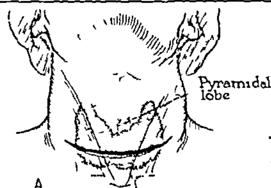
RESECTION FOR NON MALIGNANCY

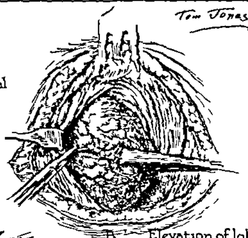


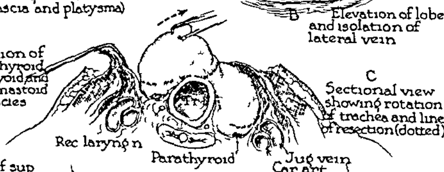


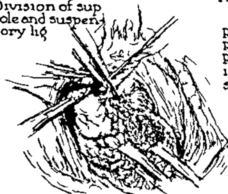
OPERATIVE TREATMENT OF PILONIDAL SINUS

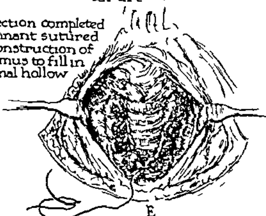


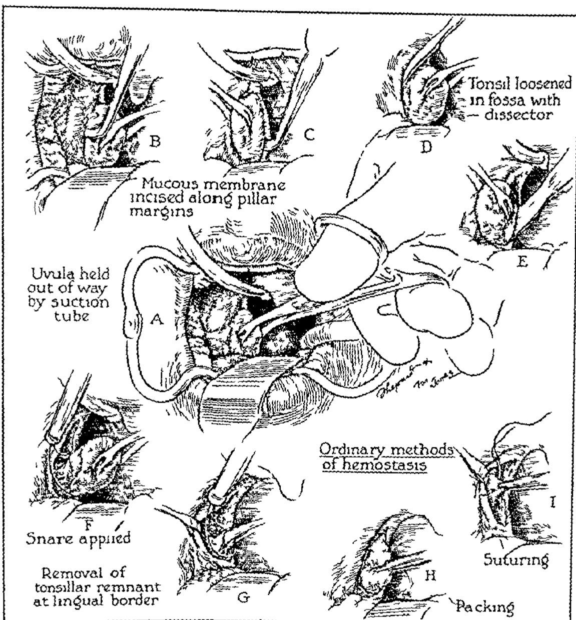

Pyramidal lobe
A
Incision
(Passing thru skin
fat fascia and platysma)

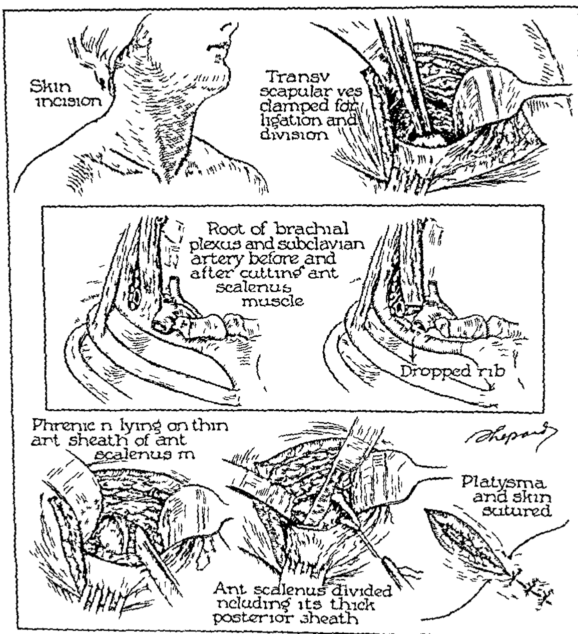

Tom Jones
B
Elevation of lobe
and isolation of
lateral vein

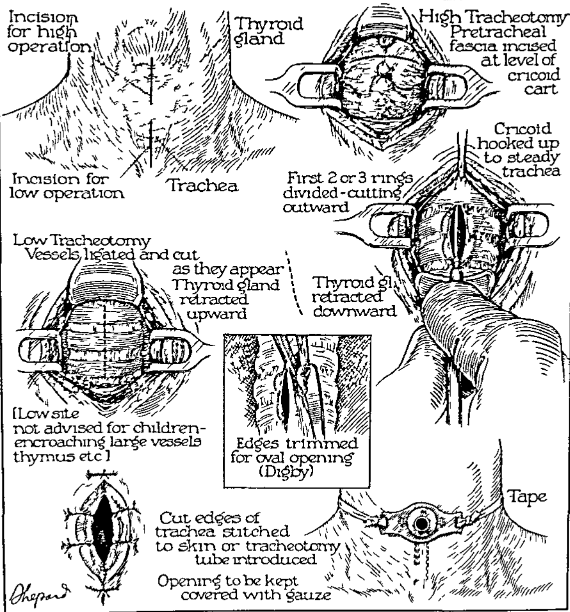

Retraction of
sternothyroid
sternohyoid and
sternomastoid
muscles
C
Sectional view
showing rotation
of trachea and line
of resection (dotted)
Rec laryng n
Parathyroid
Jug vein
Car art


Division of sup
pole and suspen-
sory lig
D


Resection completed
Remnant sutured
Reconstruction of
isthmus to fill in
sternal hollow
E

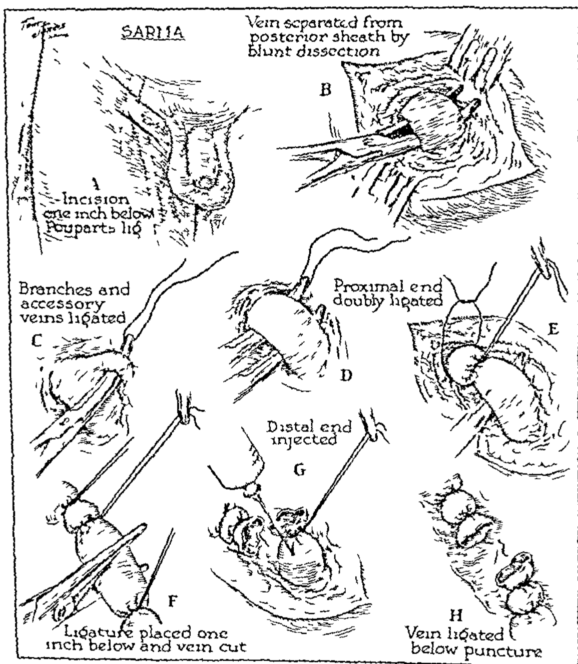

Tonsil loosened
in fossa with
dissector
B
C
D
Mucous membrane
incised along pillar
margins
E
Uvula held
out of way
by suction
tube
A
Ordinary methods
of hemostasis
F
Snare applied
I
Suturing
Removal of
tonsillar remnant
at lingual border
G
H
Packing

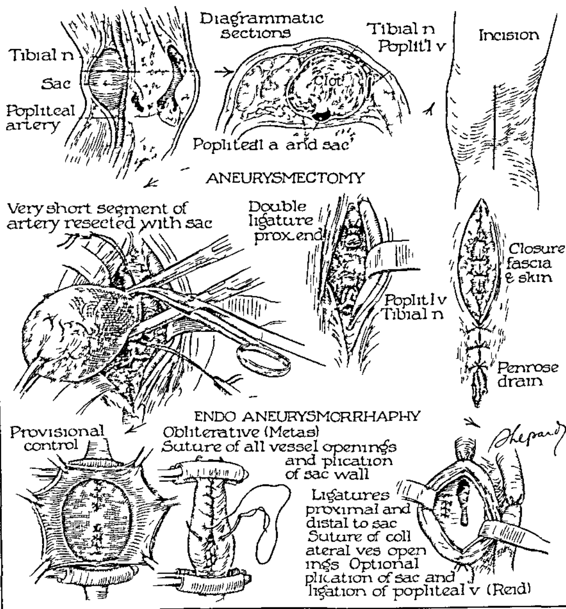

Skin incision
Transv scapular ves clamped for ligation and division
Root of brachial plexus and subclavian artery before and after cutting ant scalenus muscle
Dropped rib
Phrenic n lying on thin art sheath of ant scalenus m
Platysma and skin sutured
Ant scalenus divided ncluding its thick posterior sheath

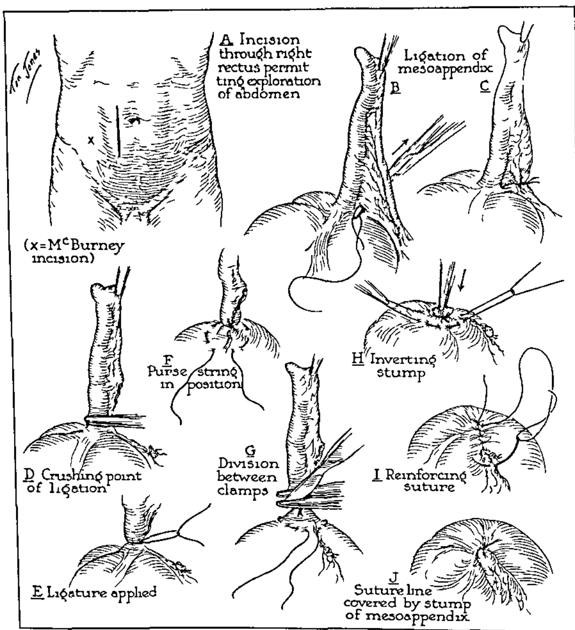


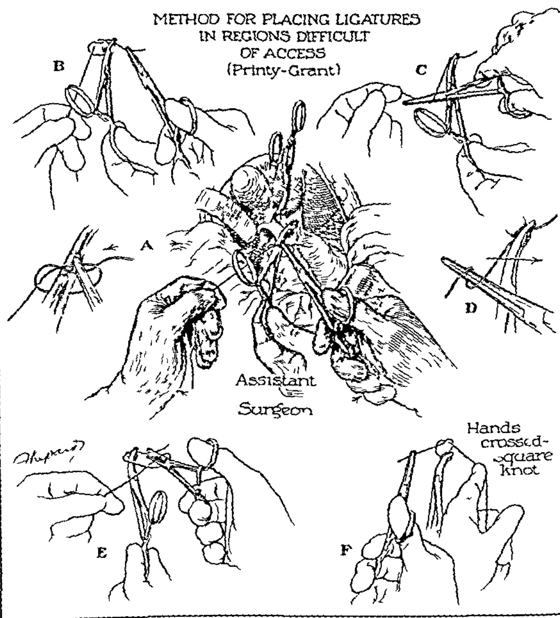
Incision for high operation
Thyroid gland
High Tracheotomy Pretracheal fascia incised at level of cricoid cart
Cricoid hooked up to steady trachea
Incision for low operation
Trachea
First 2 or 3 rings divided-cutting outward
Low Tracheotomy Vessels ligated and cut as they appear
Thyroid gland retracted upward
Thyroid gl retracted downward
[Low site not advised for children-encroaching large vessels thymus etc]
Edges trimmed for oval opening (Digby)
Tape
Cut edges of trachea stitched to skin or tracheotomy tube introduced
Opening to be kept covered with gauze
Shepard

LIGATION OF VARICOSE SAPHENOUS VEIN

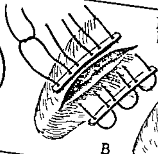


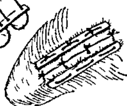

Diagrammatic sections
Tibial n
Poplit'l v
Incision
Tibial n
Sac
Popliteal artery
Clot
Popliteal a and sac
ANEURYSMECTOMY
Very short segment of artery resected with sac
Double ligature prox. end
Closure fascia & skin
Poplit l v
Tibial n
Penrose drain
ENDO ANEURYSMORRHAPHY
Provisional control
Obliterative (Metas)
Suture of all vessel openings and plication of sac wall
Ligatures proximal and distal to sac
Suture of coll ateral ves open ings Optional plication of sac and ligation of popliteal v (Reid)
Shepard


A Incision through right rectus permitting exploration of abdomen
(x=M^c Burney incision)
Ligation of mesoappendix
B
C
D Crushing point of ligation
E Ligature applied
F Purse string in position
G Division between clamps
H Inverting stump
I Reinforcing suture
J Suture line covered by stump of mesoappendix

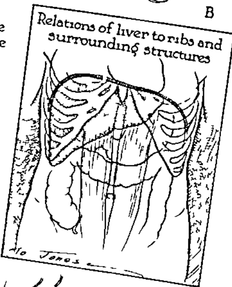

METHOD FOR PLACING LIGATURES
IN REGIONS DIFFICULT
OF ACCESS
(Printy-Grant)
B
C
A
D
Assistant
Surgeon
E
F
Hands
crossed-
square
knot

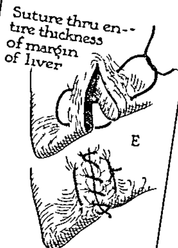






Simple
suture

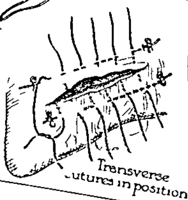




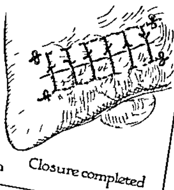
Mattress
suture



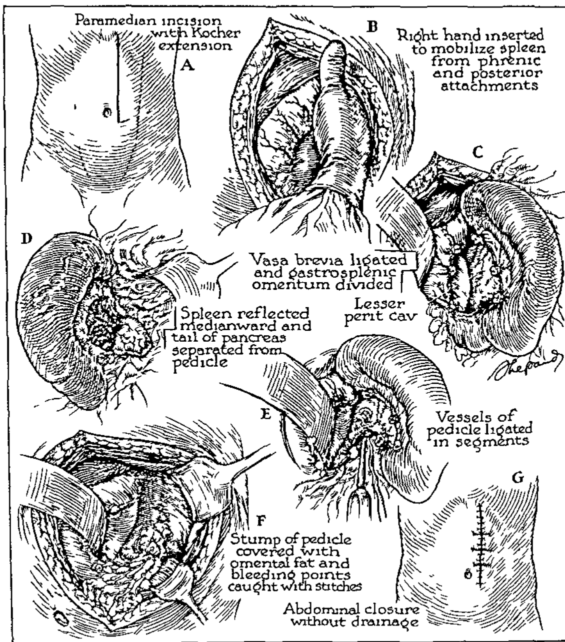
Parallel sunken strands
of catgut being placed

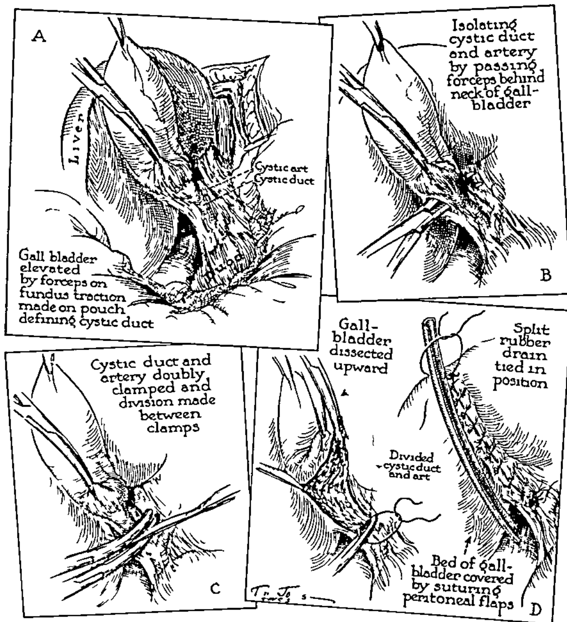


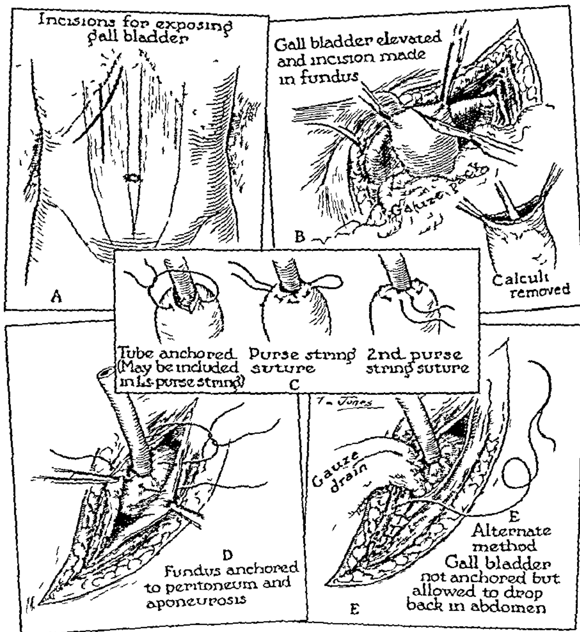
Transverse
sutures in position



Closure completed

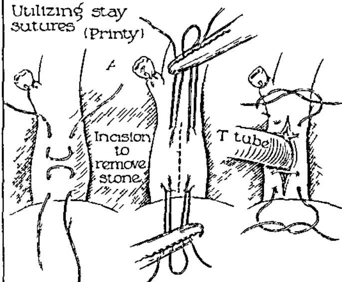

Paramedian incision with Kocher extension
A
B
Right hand inserted to mobilize spleen from phrenic and posterior attachments
C
D
Vasa brevia ligated and gastrosplenic omentum divided
Lesser perit cav
Spleen reflected medianward and tail of pancreas separated from pedicle
E
Vessels of pedicle ligated in segments
G
F
Stump of pedicle covered with omental fat and bleeding points caught with stitches
Abdominal closure without drainage

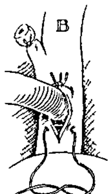

A
Liver
Cystic art
Cystic duct
Gall bladder elevated by forceps on fundus traction made on pouch defining cystic duct
Isolating cystic duct and artery by passing forceps behind neck of gall-bladder
B
Cystic duct and artery doubly clamped and division made between clamps
C
Gall-bladder dissected upward
Split rubber drain tied in position
Divided cystic duct and art
Bed of gall-bladder covered by suturing peritoneal flaps
D

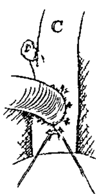

Incisions for exposing gall bladder
A
Gall bladder elevated and incision made in fundus
Gauze pack
B
Calculi removed
Tube anchored. (May be included in 1st purse string)
Purse string suture
2nd. purse string suture
C
D
Fundus anchored to peritoneum and aponeurosis
Gauze drain
E
Alternate method Gall bladder not anchored but allowed to drop back in abdomen
E

OPERATIONS ON BILIARY TRACT (No 2)

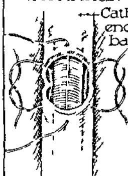
SUTURE OF THE COMMON DUCT AFTER REMOVAL OF STONE

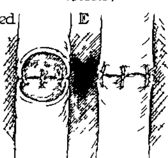






REPAIR OF INJURIES TO DUCT
(with or without drainage)







OPERATIONS ON BILIARY TRACT (No 2)

HEPATICODUODENOSTOMY

Direct
Gatewood's case

Posterior and lateral sutures placed duodenum & hepatic duct incised

T tube

Ant sutures

Modified Direct (W J Mayo)

Flap from crescent-shaped incision

Post and latrl sutures

Flap sutured to liver capsule

Plastic (Walton)

Duod opening closed around tube

Long flap

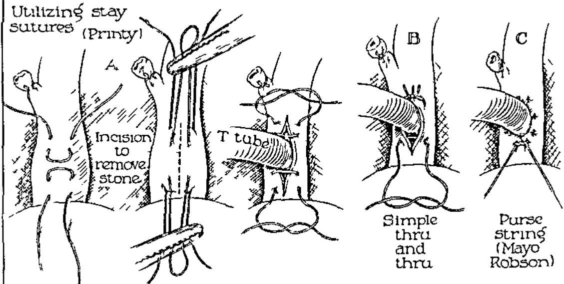
Flap sutured over tube to duodenum & duct

Indirect (Jenckel)

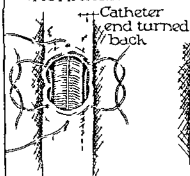
Witzel duodenostomy

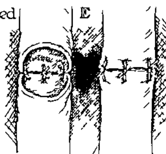
Exposed tube to be covered with adjacent tissues & omentum

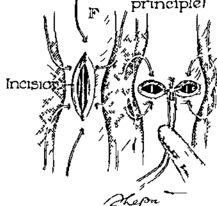
(Tube removed after epithelial outgrowth has lined new canal)



REPAIR OF INJURIES TO DUCT
(with or without drainage)

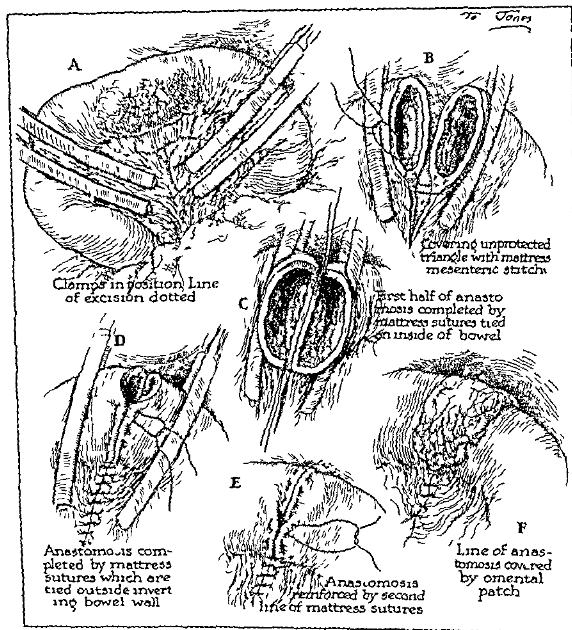


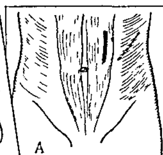




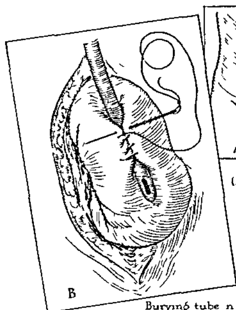
END TO-END ENTERO ENTEROSTOMY

(DYAS)

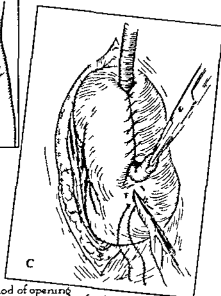




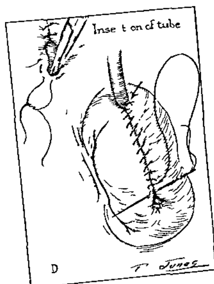
Inc sion
(Alternate incision
hown by dotted l ne)



Burying tube n
wall of int t ne



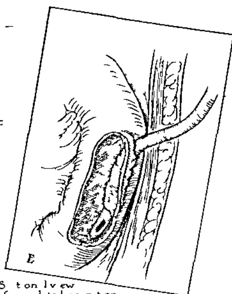
Method of opening
intest ne f ir s rt on of cathet r



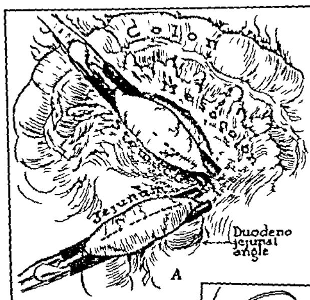
Inse t on of tube

The Lembert
Suture

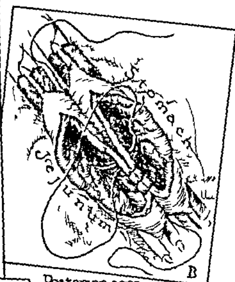
Complet on of
cl ure by con
tinu g serosa
sutu
A row shows
fixat on of t be
by n le st h



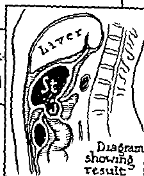
S t on l v ew
of completed op r t on

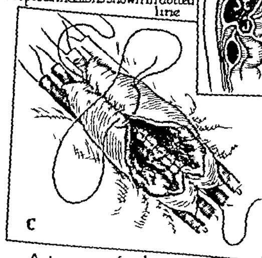


Stomach drawn thru slit meso colon clamped & ready for approximation with fold of jejunum Proposed incisions shown in dotted line

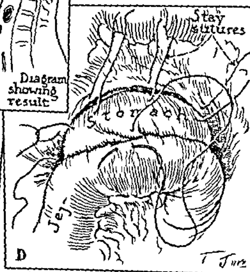


Posterior sero muscular suture placed Posterior marginal suture being placed



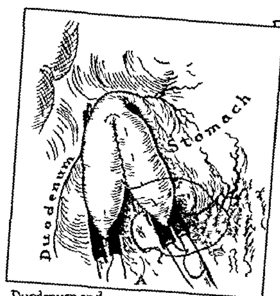


Anterior marginal suture

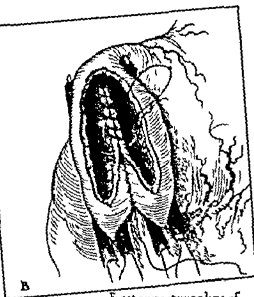


Anterior seromuscular suture

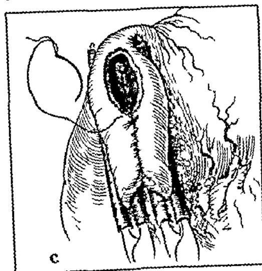
GASTRODUODENOSTOMY
(FINNEY'S TECHNIQUE)



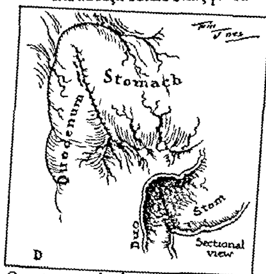
Duodenum and stomach clamped First line of sutures being placed Incision shown by dotted line



First or posterior line of sutures completed Inner through and through suture being placed



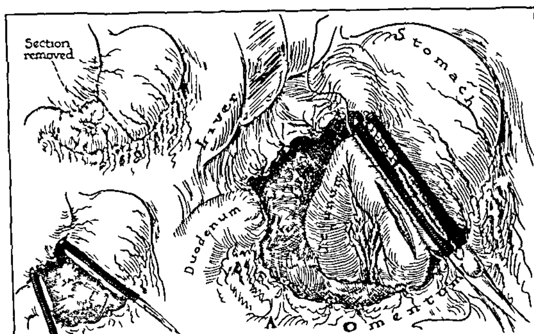
Anterior tier of sutures nearly completed



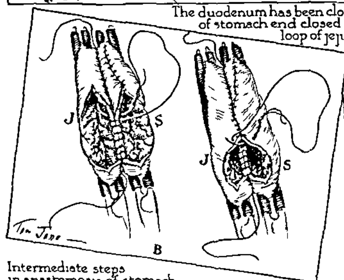
Operation completed
Outer line of seromuscular sutures seen

PARTIAL RESECTION OF STOMACH

(POLYA)



The duodenum has been closed by invagination Upper ⅓ of stomach end closed by suture. Anastomosis between loop of jejunum and lower ⅔ of stomach opening begun

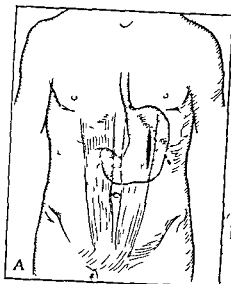


Intermediate steps in anastomosis of stomach and jejunum

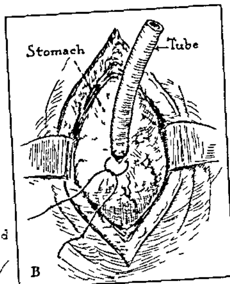


Diagram showing finished result in section

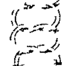
GASTROSTOMY
(STAMM METHOD)

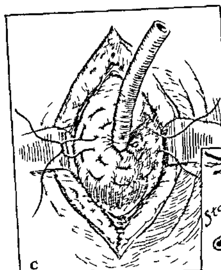


Incision (Alternate incision shown by dotted line)



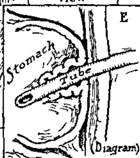
Tube fixed in stomach wall by single stitch

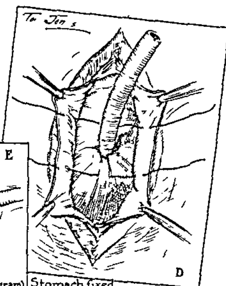




First purse string suture tied Two others placed

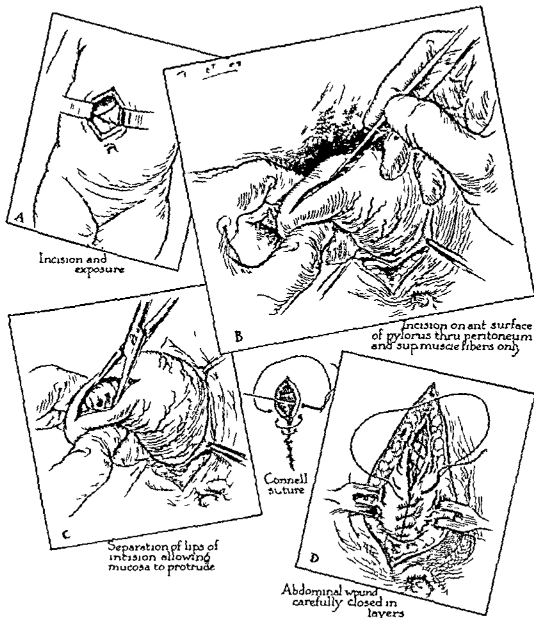
Sectional view





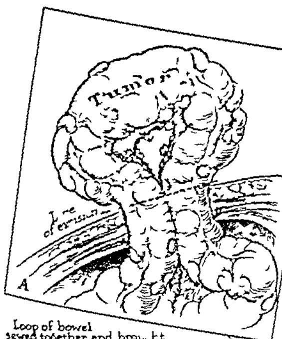
Stomach fixed to ant abdominal wall

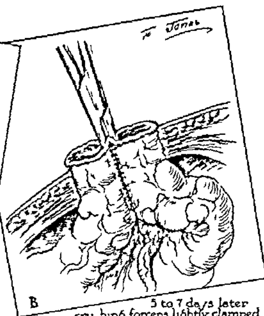
RAMMSTEDT OPERATION FOR PYLORIC STENOSIS



Point of approach indicated by direction of growth of cyst
Gastrocolic oment (most frequent)
Gastrohepatic omentum
Post leaf of mesocolon
Panc
Skin incision in midline or over tumor if contour prominent
Cyst aspirated incised and mopped out with sponges
Marsupialization
Sponges used to prevent soiling abdomen
Cyst margin
Skin
Purse string about drain
Perirenal fat
Wall of cyst too short to marsupialize
Cyst of tail reached thru kidney incision

PARTIAL RESECTION OF COLON
(MIKULICZ)





Loop of bowel sewed together and brought out through wound. Note fixation to peritoneum and fascia. Loop cut away after 4 to 8 days.

5 to 7 days later crushing forceps lightly clamped on opposed bowel walls and tightened daily until septum is cut through.

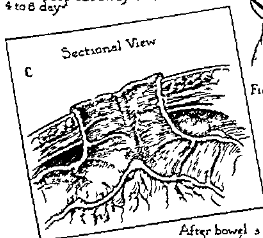
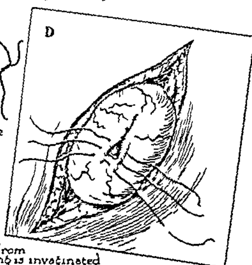


Figure of 8 suture



After bowel is freed from wound margins opening is invaginated and closed with Lembert sutures.

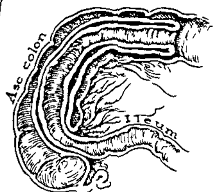
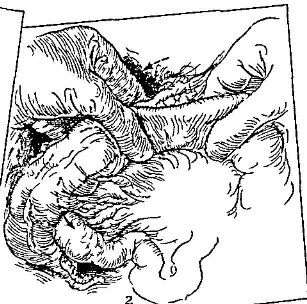
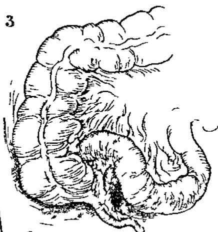


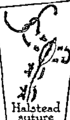
Diagram showing invagination of ileum into large bowel



Technique of reduction by pressure upon head of invaginated portion



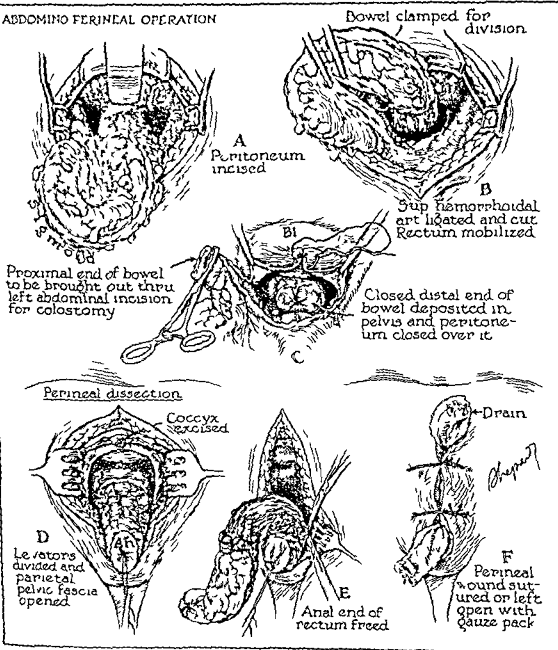
Reduction completed

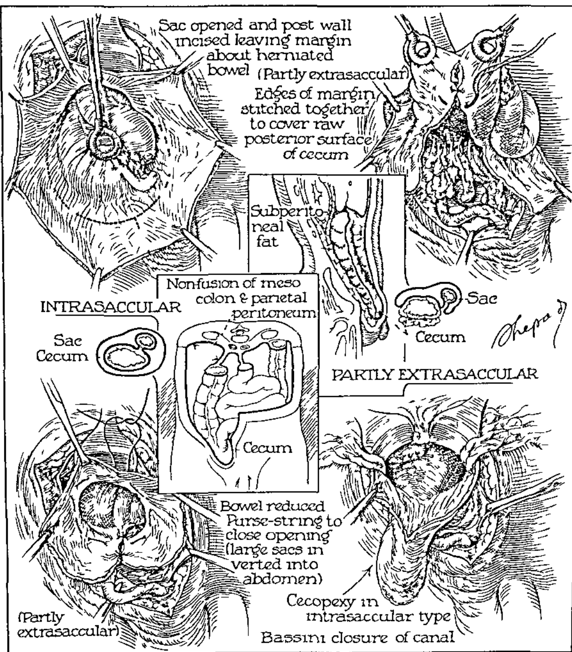


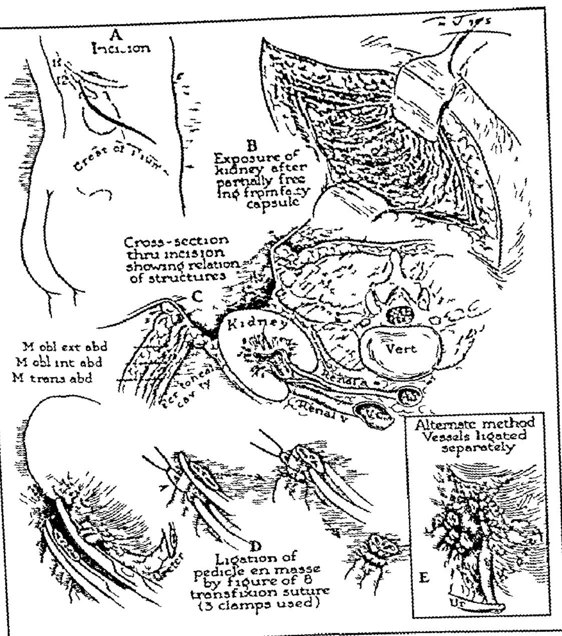
Halstead suture

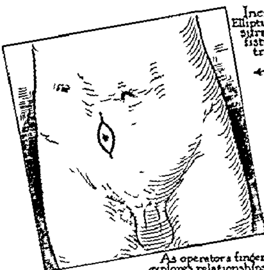
4

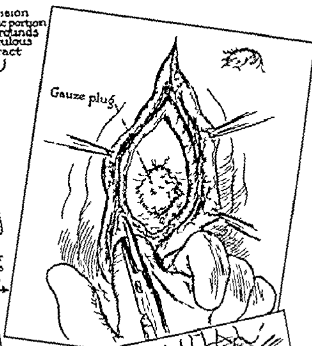
Suture of distal ileum to asc colon to prevent recurrence


ABDOMINO PERINEAL OPERATION
Bowel clamped for division
A
Peritoneum incised
B
Sup hemorrhoidal art ligated and cut
Rectum mobilized
B1
Proximal end of bowel to be brought out thru left abdominal incision for colostomy
Closed distal end of bowel deposited in pelvis and peritoneum closed over it
C
Perineal dissection
Coccyx excised
Drain
D
Levators divided and parietal pelvic fascia opened
E
Anal end of rectum freed
F
Perineal wound sutured or left open with gauze pack


Sac opened and post wall incised leaving margin about herniated bowel
(Partly extrasaccular)
Edges of margin stitched together to cover raw posterior surface of cecum
Subperitoneal fat
Nonfusion of meso colon & parietal peritoneum
INTRASACCULAR
Sac
Cecum
Sac
Cecum
PARTLY EXTRASACCULAR
Cecum
Bowel reduced
Purse-string to close opening (large sacs inverted into abdomen)
(Partly extrasaccular)
Cecopexy in intrasaccular type
Bassini closure of canal


A
Incision
Crest of Ilium
B
Exposure of kidney after partially freeing from fatty capsule
Cross-section thru incision showing relation of structures
C
Kidney
Vert
M obl ext abd
M obl int abd
M trans abd
Renal A
Renal V
Ureter
D
Ligation of pedicle en masse by figure of 8 transfixion suture (3 clamps used)
Alternate method Vessels ligated separately
E
Ur



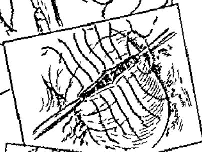


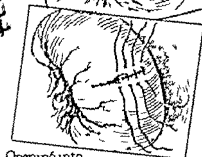
As operators finger explores relationships excision of tract is completed by scissors



Neck of tract exposed
Cut away from intestine along dotted line

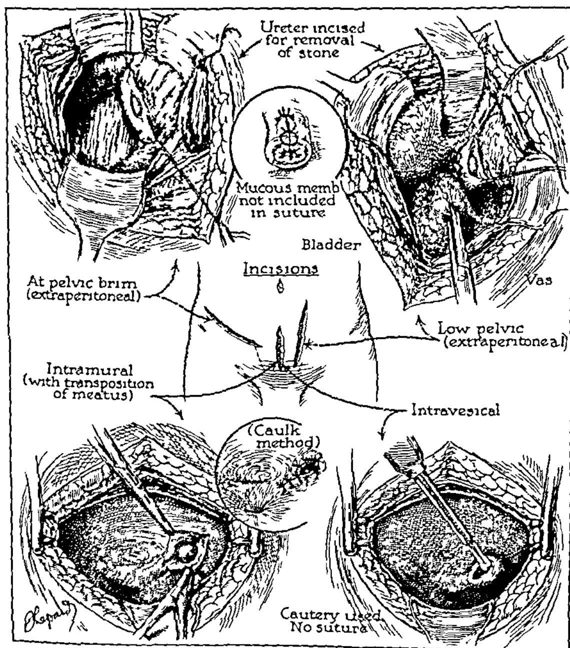






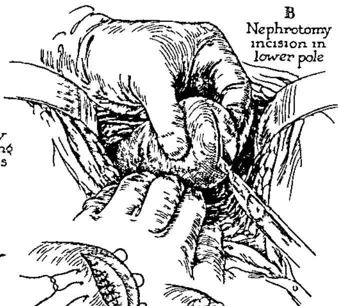
Opening into intestine closed transversely

REMOVAL OF LOW URETERAL CALCULUS



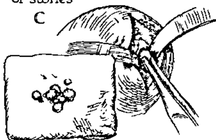


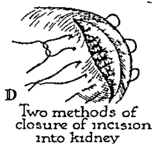
A
X ray showing stones



B
Nephrotomy incision in lower pole

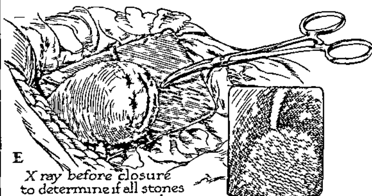
Removal of stones
C



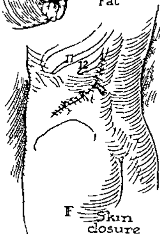




D
Two methods of closure of incision into kidney

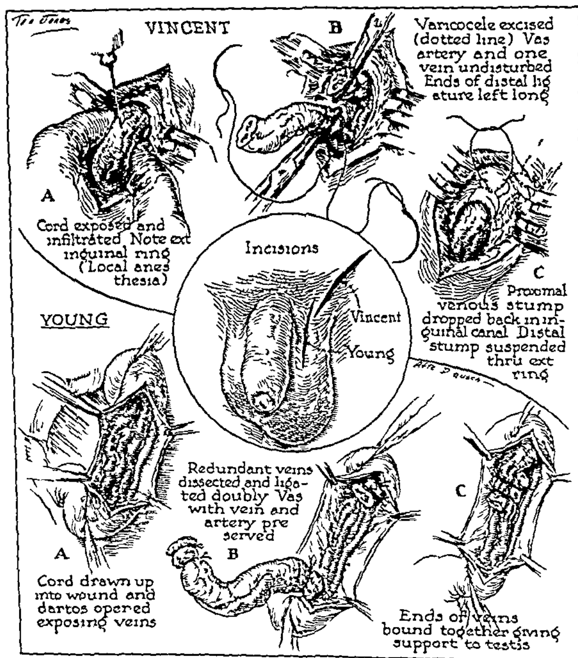


E
X ray before closure to determine if all stones have been removed

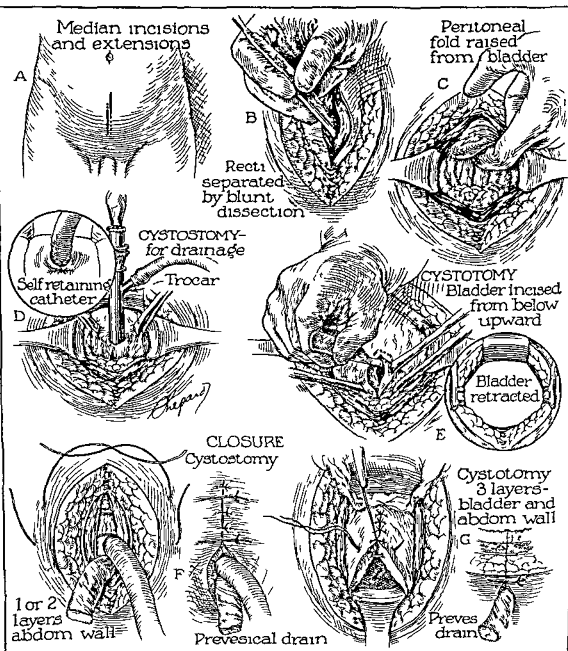


F Skin closure

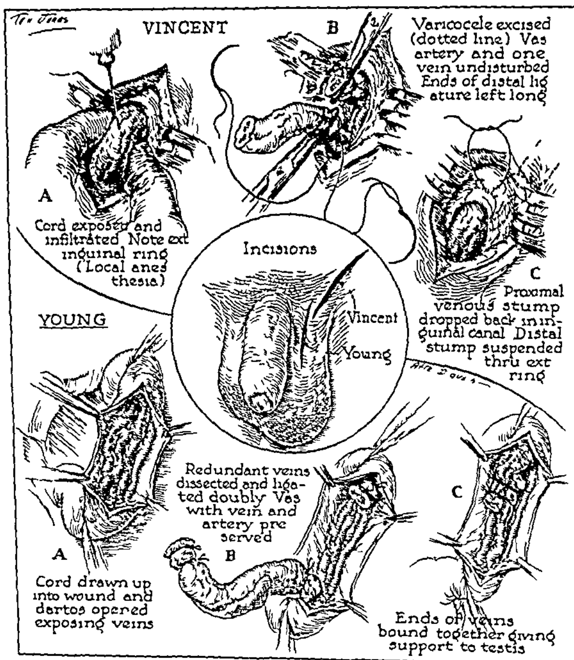
OPERATIONS FOR VARICOCELE
(OR VARICOCELECTOMY)



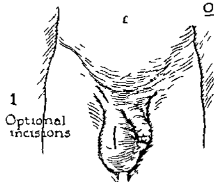
SUPRAPUBIC CYSTOSTOMY AND CYSTOTOMY



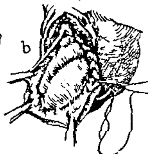
OPERATIONS FOR VARICOCELE
(OR VARICOCELECTOMY)

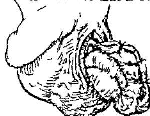


OPEN OPERATIONS





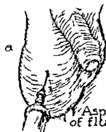


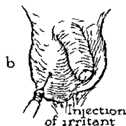




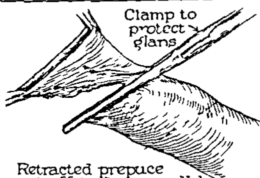


4 INJECTION METHOD



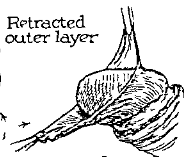




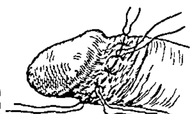


Retracted prepuce cut off in line parallel with corona





Inner layer trimmed to within one cm of corona





Alternate stitches of layers left long to include strip of vasalined gauze



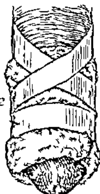
Desired result partly covered glans

SECOND METHOD

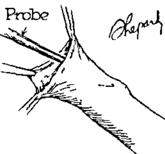
Cut

Dorsal split (Continuous suture of layers)

Adhesive

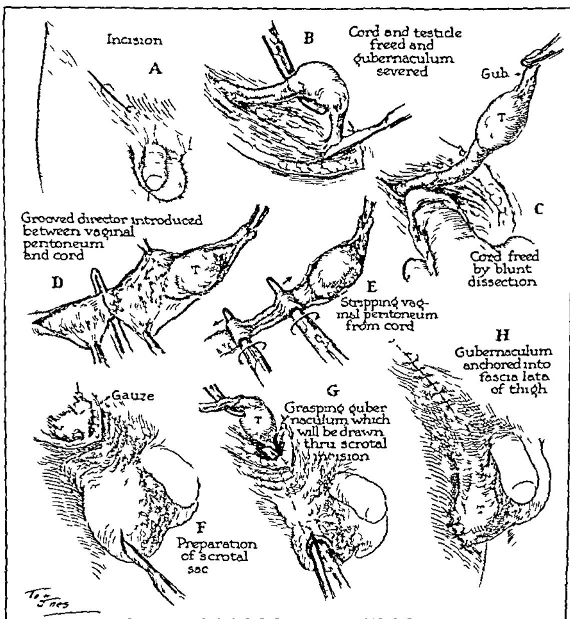


Vasalined gauze dressing

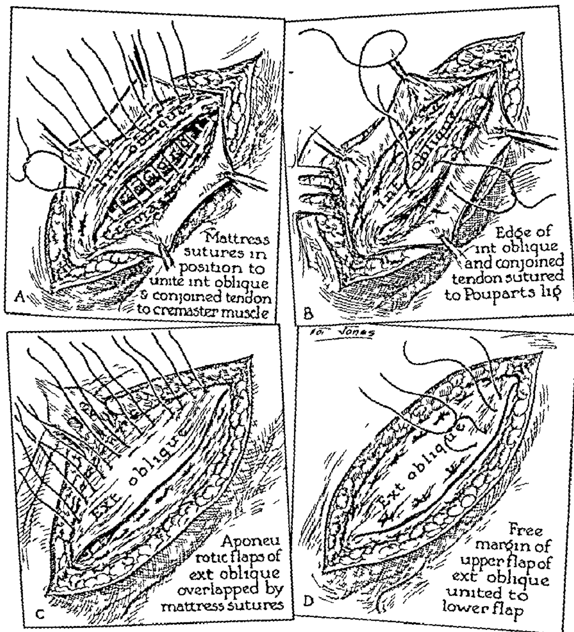


If adherent prepuce separated from glans

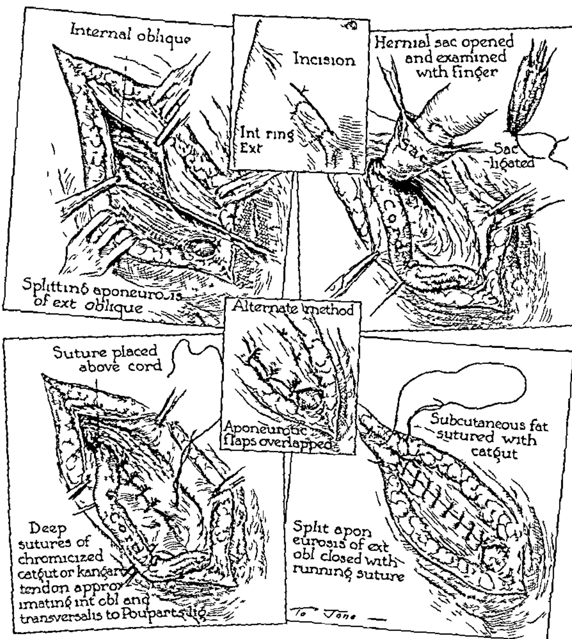
OPERATION FOR UNDESCENDED TESTIS
(McKENNA)



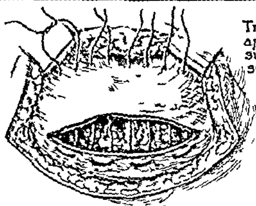
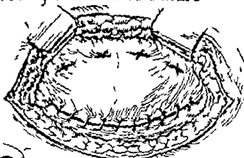
HALSTED OPERATION FOR INDIRECT INGUINAL HERNIA



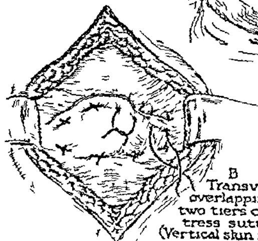
BASSINI OPERATION FOR INDIRECT INGUINAL HERNIA

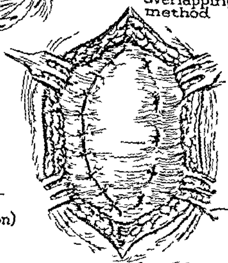


METHODS OF REPAIR IN LARGE UMBILICAL HERNIA

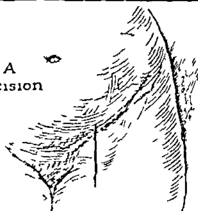



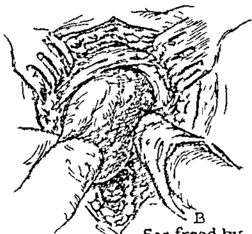


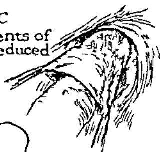




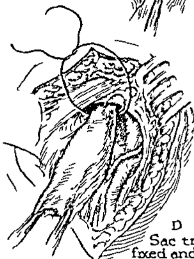
REPAIR OF FEMORAL HERNIA

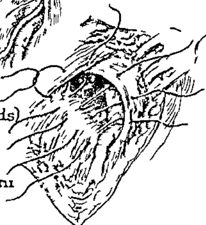




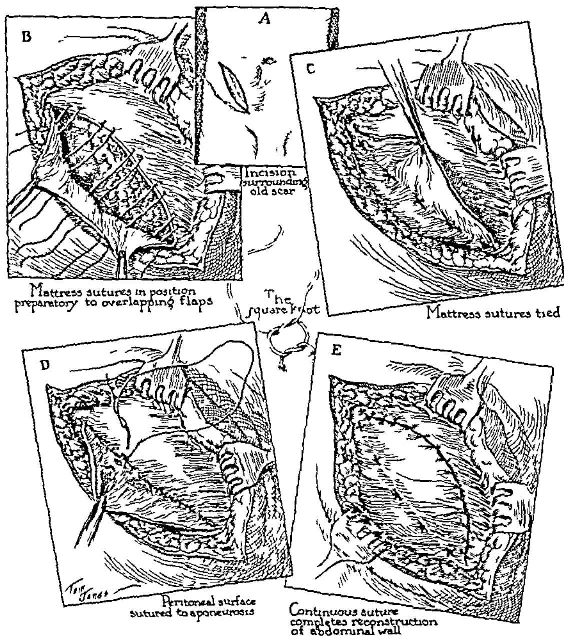




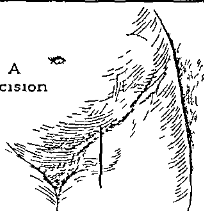


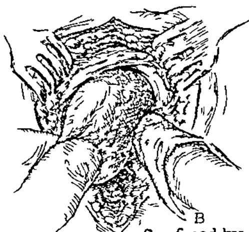


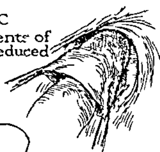
AN OPERATION FOR POSTOPERATIVE VENTRAL HERNIA (JUDD METHOD)

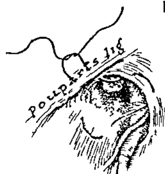


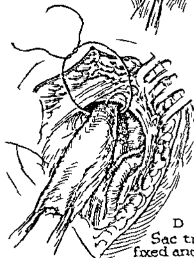
REPAIR OF FEMORAL HERNIA

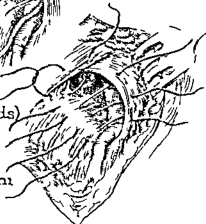


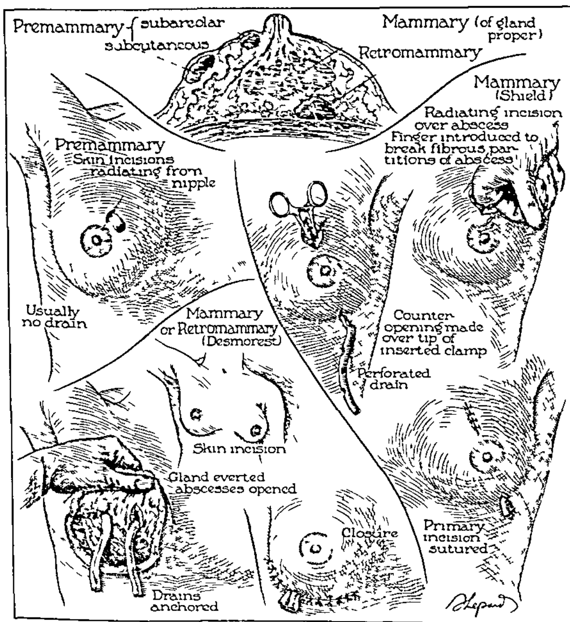


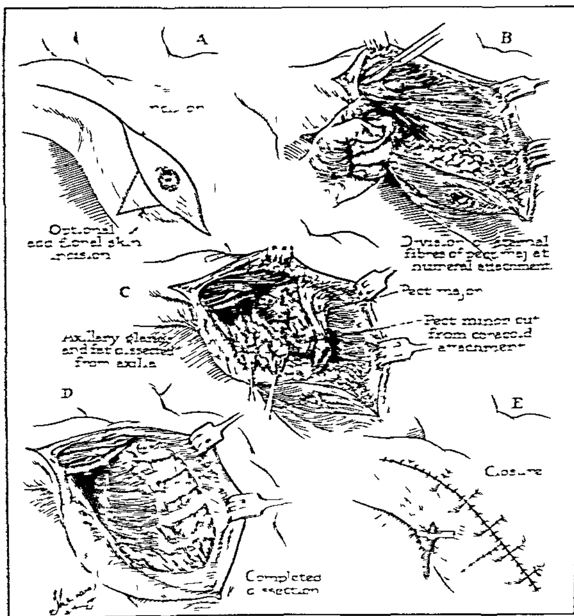




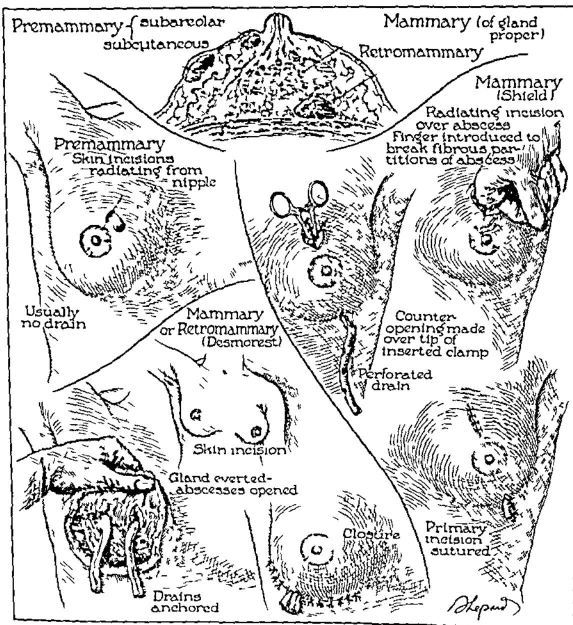


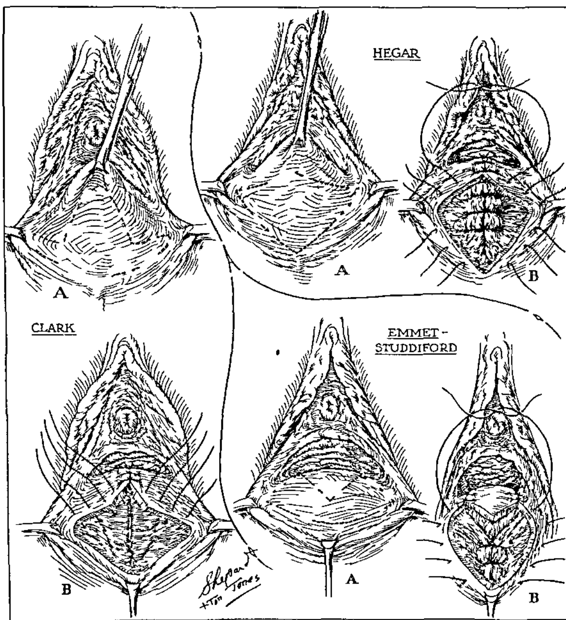


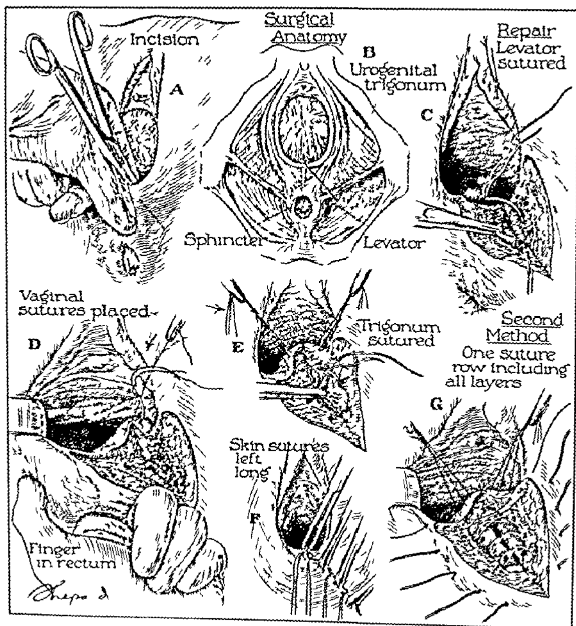

Premammary { subareolar
subcutaneous
Mammary (of gland proper)
Retromammary
Mammary (Shield)
Radiating incision over abscess
Finger introduced to break fibrous partitions of abscess
Premammary
Skin incisions radiating from nipple
Usually no drain
Mammary or Retromammary (Desmorest)
Counter-opening made over tip of inserted clamp
Perforated drain
Skin incision
Gland everted abscesses opened
Closure
Primary incision sutured
Drains anchored

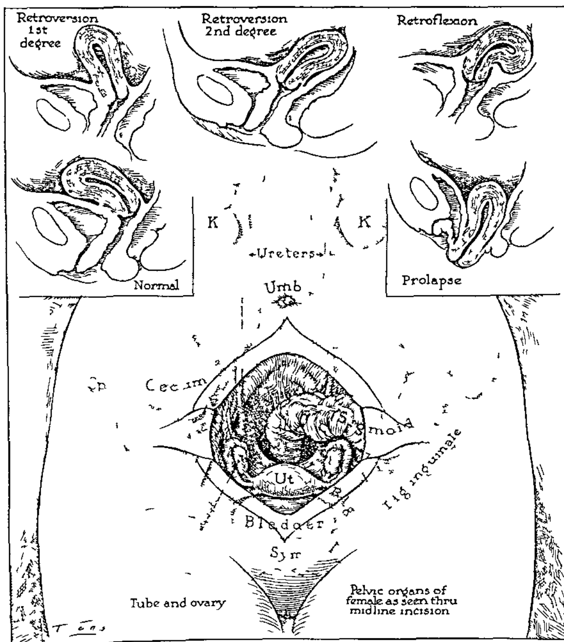

A
B
C
D
E
Optional
Pect major
Pect minor cut
from coracoid
Axillary glands
from axilla
Completed
Closure

MAMMARY ABSCESS

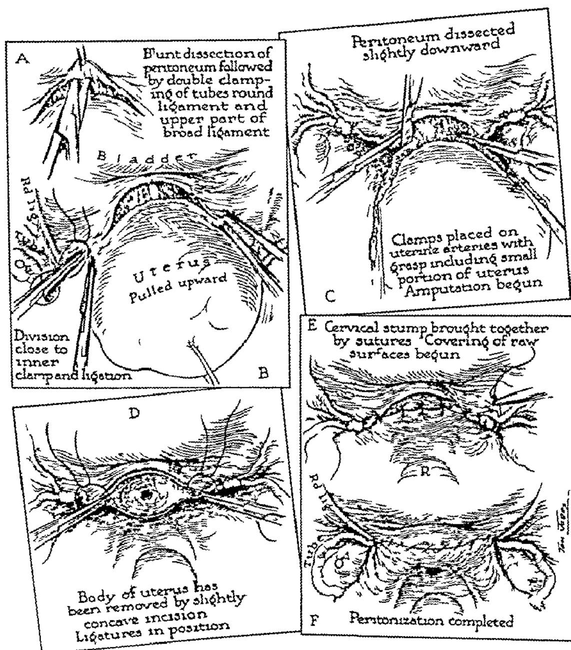


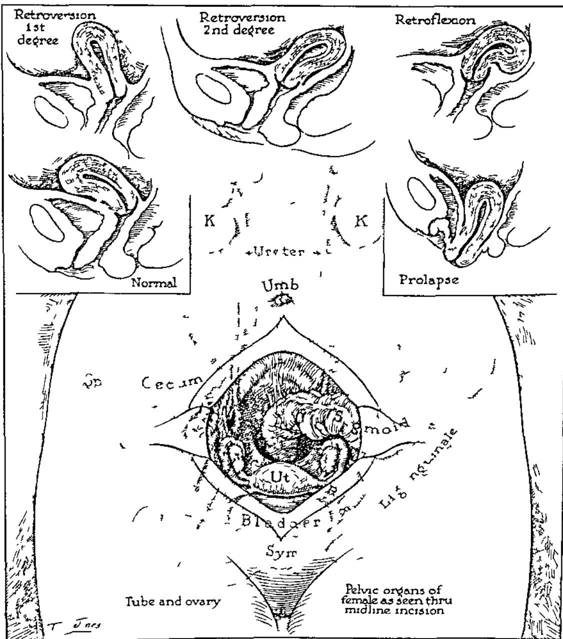

HEGAR
A
B
A
CLARK
B
EMMET-
STUDDIFORD
A
B
Shepard + Tom Jones

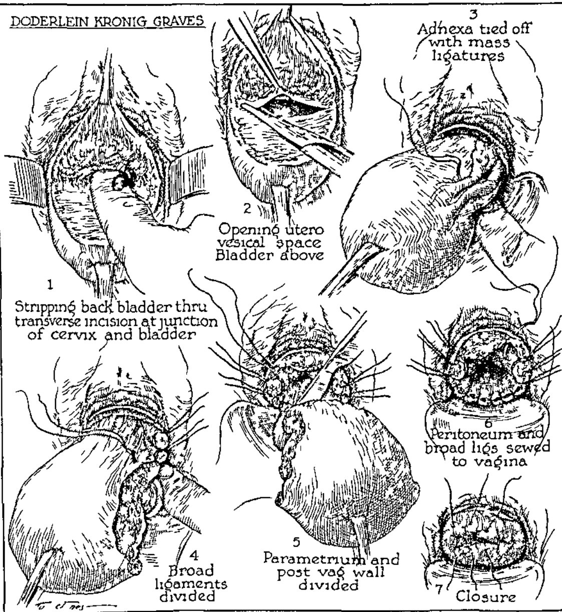

Incision
A
Surgical
Anatomy
B
Urogenital
trigonum
Sphincter
Levator
Repair
Levator
sutured
C
Vaginal
sutures placed
D
E
Trigonum
sutured
Second
Method
One suture
row including
all layers
G
Skin sutures
left
long
F
Finger
in rectum

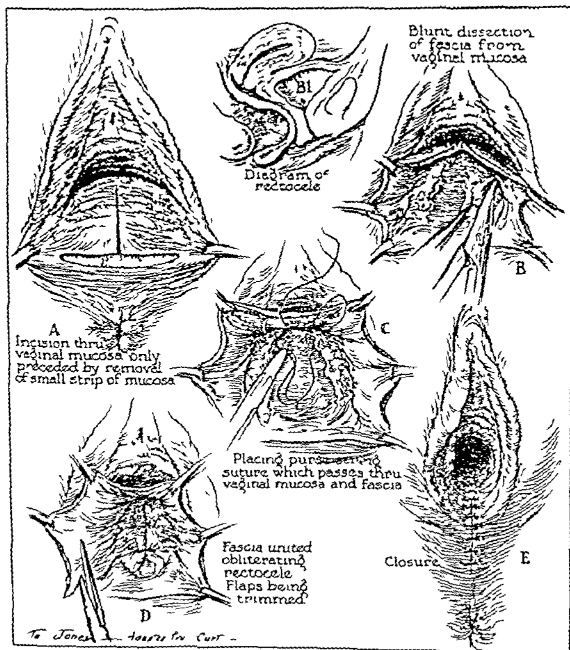

Retroversion 1st degree
Retroversion 2nd degree
Retroflexion
Normal
Prolapse
K
K
Ureters
Umb
Cecum
Sigmoid
Ut
Bladder
Lig inguinale
Sym
Tube and ovary
Pelvic organs of female as seen thru midline incision

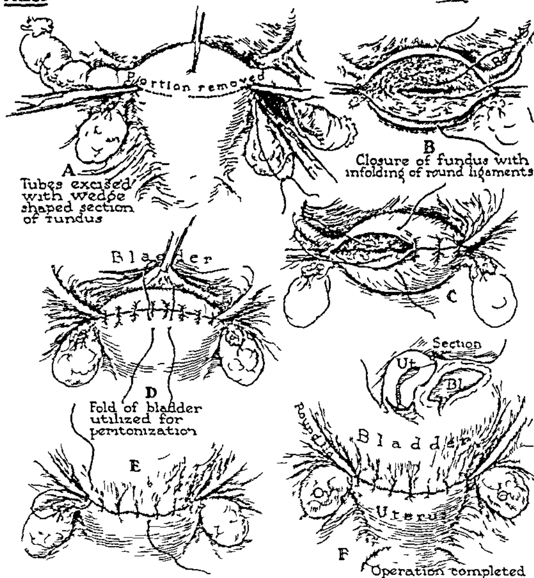
HYSTERECTOMY
(CURTIS)



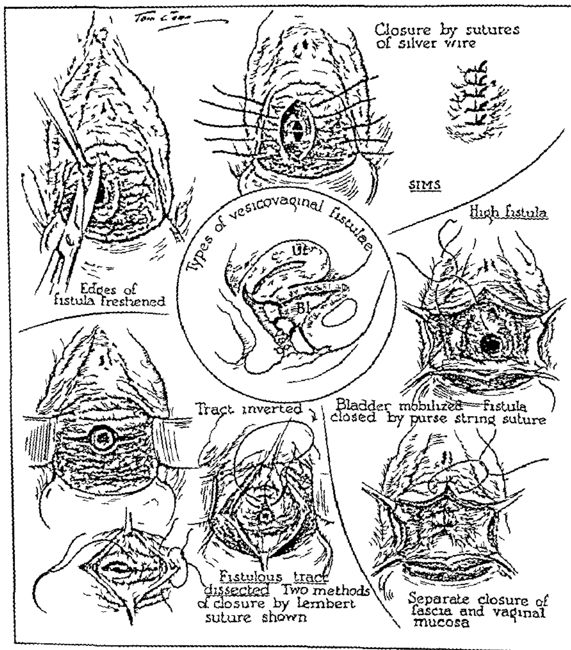

Retroversion 1st degree
Retroversion 2nd degree
Retroflexion
Normal
Prolapse
K
K
Ureter
Umb
Cecum
Sigmoid
Lig inguinale
Ut
Bladder
Sym
Tube and ovary
Pelvic organs of female as seen thru midline incision


DODERLEIN KRONIG GRAVES
1
Stripping back bladder thru transverse incision at junction of cervix and bladder
2
Opening utero vesical space Bladder above
3
Adnexa tied off with mass ligatures
4
Broad ligaments divided
5
Parametrium and post vag wall divided
6
Peritoneum and broad ligs sewed to vagina
7
Closure

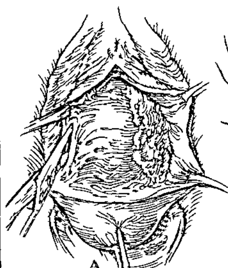

Blunt dissection of fascia from vaginal mucosa
B1
Diagram of rectocele
B
A
Incision thru vaginal mucosa only preceded by removal of small strip of mucosa
C
Placing purse string suture which passes thru vaginal mucosa and fascia
E
Closure
Fascia united obliterating rectocele Flaps being trimmed
D


FALLS
Tom Jones
Portion removed
A
Tubes excised with wedge shaped section of fundus
B
Closure of fundus with infolding of round ligaments
C
Bladder
D
Fold of bladder utilized for peritonization
E
Section
Ut
Bl
Round
Bladder
Uterus
F
Operation completed

REPAIR OF VESICOVAGINAL FISTULA



ADVANCEMENT OPERATION



Fascia separated from vaginal flaps

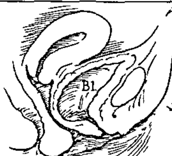
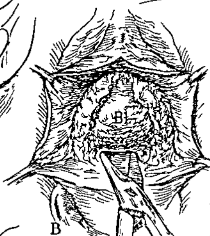
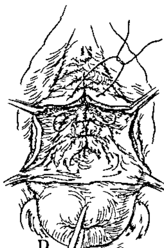


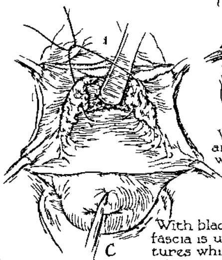
Diagram of cystocele



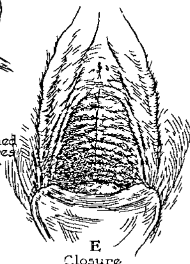
Bladder freed by blunt dissection



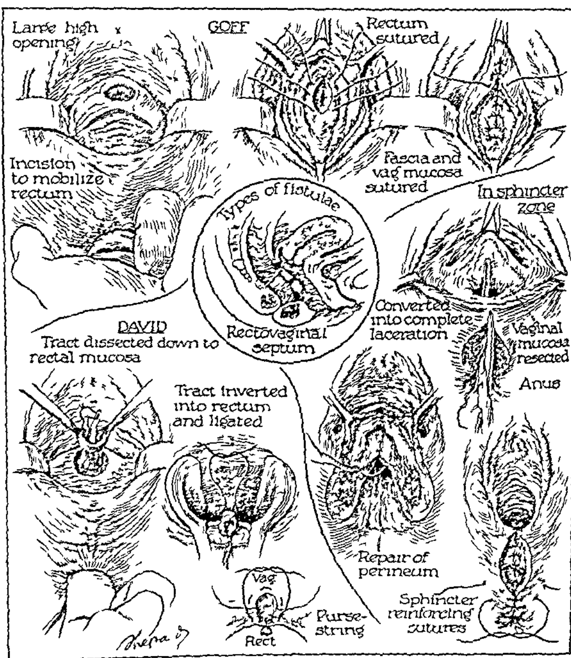
Vaginal flaps trimmed and united by sutures which grasp underlying fascia



With bladder elevated fascia is united by sutures which enter uterus



Closure


Large high opening
GOFF
Rectum sutured
Incision to mobilize rectum
Fascia and vag mucosa sutured
In sphincter zone
Types of fistulae
Rectovaginal septum
Converted into complete laceration
Vaginal mucosa resected
Anus
DAVID
Tract dissected down to rectal mucosa
Tract inverted into rectum and ligated
Repair of perineum
Vag
Purse-string
Rect
Sphincter reinforcing sutures

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